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Per. 63

PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF

Specifications

RELATING TO

WATER CLOSETS, EARTH CLOSETS, URINALS, &c.

A.D. 1775–1866.

PRINTED BY ORDER OF THE COMMISSIONERS OF PATENTS.

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PREFACE.

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embraces several distinct inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in future editions.

This volume contains Abridgments of Specifications to the end of the year 1866. From that date the Abridgments will be found in chronological order in the "Chronological "and Descriptive Index" (*see* List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

The title of this series shows the kind of inventions that it embraces. By inspection of the subject-matter index, it will be seen that water closets, earth closets, urinals, commodes, privies, and cesspools, together with all their adjuncts and appurtenances, find a place here. In searching for inventions it may be serviceable to bear in mind the most general divisions of the subject; first, the water supply, involving cisterns, valves, and pipes; second, the valve mechanism, consisting of levers, counterbalance weights and moveable seats or rods; and third, the discharge apparatus with its valves, pumps, traps, syphons, and receiving vessels.

The series, being circumscribed, does not include the supply of water to lavatories, &c. which will be found in "Hydraulics;" nor improvements in sewers and drains, which will form the subject of a special series. The following are likewise excluded from this volume, but are included in the series relating to "Medicine, Surgery, and Dentistry":—Apparatus for the special use of invalids; hygienic and sanatory apparatus; and disinfectants, either for particular or general use.

B. WOODCROFT.

July, 1873.

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INTRODUCTION.

It is generally supposed that the ancients had sparse accommodation either in respect to what would now be called privies, or to urinals, yet Vitruvius mentions a *sella familiarica* or close stool, and Fosbroke, in his Encyclopædia of Antiquities, states that vases called *gastra*, for the relief of passengers, were placed by the Romans upon the edges of roads and streets. It is further narrated that the pans of the close stools were frequently of gold. It is said that the Sybarites invented chamber utensils because they would not be at the trouble of moving; they were chiefly of glass, but sometimes of metal or pottery, and were of the form of boats for women. The Romans had them brought by snapping the fingers. One, belonging to Queen Elizabeth, was of silver. The form was sometimes a truncated cone, and they were made with a large handle. (See Fosbroke's *Encyclopædia of Antiquities*, pp. 291 and 526.)

Cesspools and privy pits are so great a nuisance and so injurious to health, that, in all large cities, a system of drainage is preferred, therefore cesspools may be said to be properly and efficiently supplanted by a well-planned arrangement of sewers. In order to permit the soil to enter, the cesspool must necessarily be in some degree open to the atmosphere; this fact alone is sufficiently condemnatory; but, from the culpability of builders and the carelessness of householders, these pestiferous places are for the most part leaky, and poison the water as well as the air of the habitation to which they belong. Many of the early inventions in this series of abridgments relate to emptying cesspools, but the emanations infect a whole neighbourhood during the process, and, whatever precautions are taken, the emptying of a cesspool is a great nuisance. The following remark of Dr. Reid, puts forth only one out of many instances that might be cited, to show the evil of cesspools:—"In one court, the " *whole products* of waste cabbage water, &c., from the public

" kitchen evaporated from a cesspool under it, which had not " been cleaned for twenty years. When the cesspool was ex" amined, I found that it had no communication whatever with " any external discharge; and that during the long period " mentioned, there was abundant evidence to prove that all the " liquid products it had received had no escape, except by " evaporation into the atmosphere that supplied the courts " above." The roughest open gutter is preferable to a cesspool; for it is sure to attract attention, while the cesspool is out of sight, and therefore out of mind, generating the most deadly gases. (See *Chambers's information for the People*, Art. 30, pp. 476–479.)

Within the last fourteen years, the dry earth system, has attracted much attention, and has been adopted at home and abroad, in hospitals, villages, and towns. The advantages of this system are:—1st. Earth or clay, dry and sifted, can deodorise excreta, and check putrefaction. 2nd. The limit of the power of deodorisation is the saturation of the earth used, by the vapour and liquid of the excreta; for within an hour or two after the earth in the receptacle of a closet becomes so saturated with urine as to approach at all to the consistency of mud, the escape of ammonia (which with a proper use of earth is not to be perceived) is, in that case, distinctly perceptible. 3rd. Dry earth possesses, for the purposes of deodorisation and of restraint of putrefaction, the capability of repeated action or use. When, after use in a closet, it becomes thoroughly mixed with the excreta and is dry, its deodorising power is then as great as ever, and it may so be used with equal efficacy, five, ten, or twenty times. The last attribute favours the introduction of the system into towns.

Another feature of the dry earth system is to apply the earth to the excreta at the time of their production. In order that deodorisation may be complete, the due proportion of dry earth must be applied at once and in detail. In the case of a closet, the quantity applied on each dejection should be sufficient not only to cover and deodorise the solid, but also to absorb the liquid excreta.

It is said that to deodorise the excreta of 1,000 persons, 30,000 gallons of water per day are required, whereas two tons of dry earth will effect the same object by the dry earth system. A man and boy, or two men, with a horse and cart, could supply *that earth and remove* it. Moreover such supply and removal might be daily, weekly, monthly, or quarterly, according to circumstances.

The forms of closet, for the dry earth system, are :—1st. The "commode." 2nd. The single fixed closet, for private houses. 3rd. Compound closets, for barracks, &c.

Dr. Mouat, Inspector-general of jails in India, has caused experiments to be made which show that dry earth is better than any chemical disinfectant for removing smell from night soil. Captain Armytage, governor of the West Riding prison at Wakefield, stated in 1867, that the earth closets used in the prison cells afforded scarcely any odour, and certainly less than when the water closet system was used. The earth closet system has also produced a marked improvement upon the health of the Dorset County School at Dorchester. The English Government, it is said, contemplate adopting this system in the jails, prisons, and dispensaries of India.

(See The Rev. Henry Moule's work, entitled *The Dry Earth System*, 8vo., London, 1871; also, Art. "Sewage earth closet," in the supplement of *Chambers's Encyclopædia*, p. 732.)

Having narrated the peculiarities and applications of the most practical way of treating excreta when systematic drainage is not advisable or not possible, it will be right to notice some of the more salient points of the water-cleansing system usually adopted in large towns. In water closets that are provided with a considerable height of water by means of an upper cistern, and are trapped with two or more well constructed traps, ultimately delivering their contents into the well-conducted drainage system of a large town, perfection would seem to be attained, especially when self-acting mechanism of a simple kind is made to supply the proper quantity of water and to discharge the contents of the closet in an efficient and cleanly manner; and this would really be the case were it not that the mere fact of dilution complicates the ultimate removal and utilization of the sewage. The adoption of public conveniences of this kind in England, as well as the frequent placing of urinals, both of which improvements have been made of late years, may possibly be extended with advantage.

After the sewage matter has been removed from the house, it may be passed through a sewage filter, entering at the upper part of a partitioned tank or chamber, and then proceeding to the lower part of the said chamber; one portion of the chamber *should contain horizontal* filtering beds, through which the liquids would filter in an ascending stream. There should also be cocks and passages to draw off the liquid and to remove the solid matter, each of which may then be used as manure.

Where the sewage has been emptied into the sea, tide-locked drains are objectionable. It is worthy of remark that sewage, when mixed with salt water, gives off more effluvium than under any other treatment. (See Art. " Sewage " in *Chambers's Encyclopædia.*)

In December 1867, the Metropolitan Association of the medical officers of health, discussed the comparative merits of the water closet and dry-earth systems. Opinions were mostly in favour of he dry-earth system, in consequence of the readiness with which water closets get out of order (especially in the dwellings of the poor), and thus become sources of grave danger. On this subject, Dr. Parkes, in an annual report on Hygiene (*Army Medical Reports*, 1867), observes "That the earth plan which has been " proved most useful in India, can be applied in England ad-" vantageously on a small scale is certain ; but it is still a " question whether it is applicable to our large towns on account " of the large quantity of earth which has to be brought in and " taken away." (See *The Sewage of Towns,* papers by various authors, edited by John Hutchman, London, 1866.)

In every closet, whether water closet or earth closet, experience shows that good ventilation is absolutely necessary; this may be accomplished by connecting the upper part of the closet with a chimney by means of a ventilating shaft.

WATER CLOSETS, EARTH CLOSETS, URINALS, &c.

A.D. 1775, November 11.—N° 1105.

CUMMING, Alexander.—"Watercloset upon a new construction."

The improvements in this water closet relate to "the shape of the pan or bason, the manner of admitting the water into it, and on having the stink trap so constructed that its contents shall or may be totally emptied every time the closet is used." The basin has "all its horizontal sections circular, or nearly so;" the aperture at the lower part of it is opened and closed by means of a "slider;" the water is admitted into it "through a slit about an inch and a quarter long, about one quarter of an inch wide, and about four or five inches above the aperture which empties the pan or bason," and "the pipe which carries off the soil and water is recurved about twelve or eighteen inches below the pan or bason, so as constantly to retain a quantity of water sufficient to cut off all communication of smell from below."

"When the pressure of water in the feeding pipe is so great as to make it enter the pan or bason with a squirt, the pipe must be cut, and that part of it which comes from the reservoir soldered into the circumference of a round or cylindric box of about four or five inches diameter, and as many in length, and in the middle of one of the ends of this box must be soldered, the other part of the feeding pipe which goes to the pan or bason, by which means, and the regulating cock above, the" [water from the ?] "box may be made to enter the pan or bason with a velocity equal to what would be communicated by any desired smaller perpendicular" [vertical ?] "pressure of water."

[Printed, 6d. Drawing. See Rolls Chapel Reports, 6th Report, p. 182.]

W.C.

A.D. 1777, July 14.—N° 1160.

PROSSER, Lemuel.—" A watercloset, upon an entirely new " construction, which will always remain free from any offensive " smell."

A reservoir is attached to the basin of this closet, in which are placed two balls, which work a stop-cock. When the basin is empty these balls act and cause water to flow into it. It is neither mentioned in the Specification, nor is it indicated in the drawing, whether or not a valve is affixed under the basin to retain the water in it.

[Printed, 6*d*. Drawing.]

A.D. 1778, January 27.—N° 1177.

BRAMAH, Joseph.—" Watercloset upon a new construction."

In this water closet two valves are simultaneously acted upon by the movement of the handle. The one valve is placed under the bottom of the basin, and, when closed, retains any water that may be therein, thus cutting off all smell. It " moves on a horizontal axis, and in such a direction that its surface is the " thoroughly washed every time the contents of the bason is " discharged, both by the water's falling upon it whilst opening, " and by its meeting the water when shutting to again." The other valve is placed either in the service box, or "in the top " part of the feeding pipe;" this valve opens and shuts in a similar manner, " all ways meeting the natural currency of water " when shutting, and falls from it when opened, and is not " liable at any time to have its motion obstructed by the frost, " no part of it being immerged in water. Its movement is communicated through a lead pipe or tube soddered into the part " where it acts, and is continued above the highest surface of the " water in the reservoir, so that this movement is not exposed to " the water which is retained in the reservoir."

[Printed, 8*d*. Drawing. See Webster's Reports, vol. 1, pp. 76 and 194; Webster's Patent Law, p. 126, case 23; Carpmael's Reports on Patent Cases, vol. 1, p. 168; Parliamentary Report, p. 168; Holroyd on Patents, p. 81; Billing on Patents, p. 59; Patentees' Manual, p. 57; and Rolls Chapel Reports, 6th Report, p. 163.]

A.D. 1782, August 1.—N° 1336.

CREASE, James.—" A pot or pan to be applied to a night " stool, or necessary or other purposes, which would prevent

" offensive smells, and be of public utility." The vessel is made of metal, glass, or earthenware, it has a groove or channel either fixed round on the brim, or in the inside or outside, near or at a distance below the rim. The groove contains water or other fluid, and the lid drops into it.

[Printed, 4*d.* No Drawings. Rolls Chapel Reports, 6th Report, p. 142.]

A.D. 1783, May 17.—Nº 1372.

RIZ, DAVID.—" A machine or appatus " [apparatus ?] " on a " new construction and principle, applicable to water closets, " night tables or chairs."

The machines " are made cylindrical and conical, and divided " into several partitions or cisterns, and stand vertical or horizontal under the seat of water-closet, night table or chair. Those " that stand vertical have their partitions or cisterns at the side " or circumference, and turn in another cylender, and are air and " water-tight, having their proper openings for inlet and outlet. " Those that lay horizontal have their partitions or cisterns at " top, turning under a cover, and have also a moveable or fixed " bottom, according to the place it is to be used and applied, and " are also air and water-tight, with their proper inlett and outlet. " Each partition, division, or cistern of those that lay orizontal " when made use of is turned under the cover, and those that " stand verticle is turned off to another part of the outward " cylender. Another mode of making this apparatus for smaller " water chairs, closets, &c., is that of having one cone to work " in another. The outward cone is fized in the center of a " cylender or other figured vessel, which have seperate divisions " or cisterns, all of them air or water-tight. At the lower part " of the inner cone is one opening or outlet, which have a moveable cover or stop. The outward or fixt cone has as many " openings as their are divisions or cisterns in the cylindrical or " other figured vessels used, one other of which is always opposite to the opening of the inner cone; and when made use of " the contents will naturally drop into such divisions or cisterns " when its cover or stop is removed, and by turning round the " said cylender, or other figured vessel the outward cone is fixed " to, the offensive part is removed away, and a clean cistern " brought opposite to the opening of the inner cone, by machinery annexed to each of the above-described apparatus, com-

" posed either of wheels, racks, levers, springs, chains, pinions, " valves, or sliders, as is best adapted to the place made use of, " and the whole is so constructed as to prevent any offensive " smell or vapour transpiring, they admitting of water being " poured into each cistern or partition, or conveyed therein by " pipes, or by hydrastatick means and machenery, either annexed " or detached from it; and the primary motion given them is " either by means of lifting and shutting the cover of such " watercloset, night tables, &c., or by pulling of leavers, wheels, " racks, or springs, as may be most convenient, whereby the " same effect is produced."

[Printed, 4*d*. No Drawings.]

A.D. 1789, December 8.—Nº 1714.

ROWNTREE, THOMAS.—"A new improvement in the con- " struction of waterclosets, and which may be applicable to other " useful purposes."

This invention consists of such a disposition of the several parts of a water closet as to render the whole apparatus portable or "capable of being moved together." "The reservoir for the " water, which may either be hot, cold, or medicated, is fixed " in the same piece of furniture as the bason and soil receiver." " The stench is prevented from getting out of the receiver by " means of the soil pipe from the bason forming an air-tight " junction with it," by a water or other joint. A "circular " sliding valve" may be used to prevent the stench from getting through the opening of the basin; this valve "has the pro- " perties of both a valve and a cock, and is made to perform its " office, either by moving all round each operation, or to pass " one part of the way, and return in such a manner as to open " and shut the communication between the bason and soil pipe, " and give an opportunity for the soil and water to escape into " the soil receiver." The same operation, when required, may be used to feed the basin with a supply of water from the reservoir.

In another improvement, the above described basin and soil receiver, with a separate reservoir, is applied to two or more pieces of furniture instead of one.

Another improvement consists in "the application of the bason " and circular sliding valve, either with a fixed or separate re-

" servoir to a common receiver or cesspool, by taking away the " receiver as described, and joining the soil pipe to such common " receiver or cesspool, and by that means have all the useful " properties of the most expensive waterclosets."

[Printed, 4*d*. No Drawings. See Repertory of Arts, vol. 11, p. 237; also vol. 7 (*second series*), p. 402; and Rolls Chapel Reports, 6th Report p. 181.]

A.D. 1792, May 12.—N° 1875.

ASHLEY, John.—A " new-invented self-acting water closet, " which constantly keeps itself sweet and cleaner, and is upon " a more simple construction, than any heretofore discovered."

Underneath the supply cistern is a double-boxed cistern fixed thereto. In the supply cistern is a heavy valve, which by its weight, usually closes the entrance to the upper box of the double-boxed cistern; this valve is worked from the seat of the water closet by means of wires and a lever. A second lever in the said upper box is connected at one extremity to the said heavy valve, and at its other extremity to a valve that is capable of closing a passage communicating with the lower box of the double-boxed cistern. When the valve in the supply cistern is opened by pulling the wire in connection with the water closet seat, the valve in the upper box is closed, and the water flows into the said upper box. Upon the seat being released and no longer depressed, the upper valve closes and the lower valve opens, thus admitting the water in the upper box to the lower box, and allowing it to flow down a pipe to the basin. At the same time a portion flows down a smaller pipe into a small vessel or " cod-" piece," and raises an air-ball which causes the "closer" or soil pipe valve to open and discharge the soil. At the same time the water runs out of the cod-piece into the stink trap; the ball falls, raises the closer, and prevents the effluvium from ascending. The wire in connection with the supply cistern lever is worked by the seat which is hinged for that purpose, the depression of the seat during use pulling the wire.

[Printed, 6*d*. Drawing.]

A.D. 1793, March 15.—N° 1937.

BINNS, Thomas.—A " new invented machine or apparatus for " water closets and privies, which upon a self-acting principle " *when such* water closets or privies wherein such machine or

" apparatus shall be fixed are made use of, will introduce water " into the bason in such water closet or privy, and empty and " cleanse the same, and close up the same again, leaving a proper " portion of clean water in the bason, and thereby preserving " the bason clean and preventing any offensive smell, without " the manual assistance or the attention of any person thereto."

A supply cistern, "measurer" or service box, and "sliding " conveyor" are made to supply the pan with water by the depression of the seat and its subsequent rising. The measurer is a small box or vessel, which contains the exact quantity of water necessary for the process of cleansing the basin and leaving the right amount of water therein, ready for the next occasion. The sliding conveyor is a cylindrical vessel tapered at the bottom, open at the top to receive the water from the measurer, and having a valve at the bottom by which the water may be let out of it into the basin or pan; this vessel is entirely free, and is hung to a line which passes over a pulley to a counterbalance weight. On the depression of the seat, a valve in the service box admits water thereto from the cistern, a lower valve on the same spindle closing the exit from the bottom of the service box and the valve rod being worked by levers and wires. On the liberation of the seat, the cistern valve closes, the water runs from the service box into the sliding conveyor, depressing it into contact with the supply pipe of the pan and thereby opening its valve and admitting a portion of the water to the pan. At the same time the counterbalance weight draws back the pan valve, thus permitting the soil to go into the sewer. The rising of the "sliding " conveyor," enables the rest of the water to go into the pan.

[Printed, *6d.* Drawing. See Repertory of Arts, vol. 7, p. 234; and Rolls Chapel Reports, 6th Report, p. 187.]

A.D. 1796, May 31.—N° 2111.

LAW, William. — "New improvements in and upon water- " closets."

The water is admitted to this water closet by means of a cistern and service box. The depression of the seat admits the water from the cistern to the service box, and the rising of the seat closes the opening from the cistern and opens that from the service box, thus supplying the pan with a measured quantity of water. Cranks and a wire convey the action of the seat to a spring lever that works the valves. A stem or wire proceeds from the spring lever, through a pipe or vertical trunk in the cistern, to the lever on which the cistern valve is mounted, and another stem proceeds to the service box valve. The rising of the seat causes certain catches to act on a catch wheel to discharge the contents of the pan; a hanging weight, eccentric to the axis of the pan, then brings back the pan into position for the next action of the closet.

This water closet may be acted upon a handle and vertical bar, instead of by the motion of the seat, but the principal intention of the handle shown in the drawings "is to put the self-acting " part to rights, if by want of water it might be out of order, and " to act it with warm water in extraordinary frost."

Another plan is to act upon the various levers and catches by means of a step that can be worked by the foot, and that communicates with the seat lever by means of a wire.

[Printed, 10*d*. Drawing.]

A.D. 1799, November 4.—N° 2352.

BINNS, THOMAS.—"A machine or apparatus answering the " several purposes of a portable water closet, a bidet, and easy " chair, which, together, are comprised in one third of the space " or room occupied by portable water closets now in use, and " which, from its lightness and size, is particularly calculated for " travelling, or for camps and ships."

The object of this invention is to improve on a former one, and to add thereto a bidet pan. In the former invention, the back enclosed the water cistern, and was fixed vertically on the seat. In the present invention, the back containing the cistern, shuts down on the seat in the manner of a lid. To enable it to do so, various means are employed. The first method, and that which is preferred by the inventor, consists of a screw jointed tube, one of the two angular parts of which is inserted in the bottom of the cistern, and the end of the other part is attached to the basin; one part of the tube screws into the other, and at the same time serves as a joint. When the back is raised, the screw is perfectly close. The second method consists of a similar tube but cock jointed. The third method consists of a sliding jointed tube, each part of which forms a curve of a quarter of a *circle. The fourth* method consists of a leather or other flexible or jointed tube attached to the bottom of the water cistern, and to the side of the basin.

The manner in which the bidet pan is added to the closet is by resting the rim at each end of the bidet on the front and back edge of the seat of the closet immediately over the basin. The bidet is supplied with water, either by a separate channel from the cistern, or by the same channel, through which the water is admitted to the basin. Arms or handles are employed to make the water closet serve as an easy chair; they are in two parts joined by a screw near the angle. One part of the arm, when it is screwed together, is attached to the seat, the other to the back of the closet, by sliding fastenings; these portions can thus be engaged for use or disengaged for packing,

[Printed, 6*d*. Drawing. *See* Repertory of Arts, vol. 15, p. 73; and Rolls Chapel Reports, 6th Report, p. 148.]

A.D. 1816, August 3.—N° 4051.

CHALKLEN, JOHN.—"Improvements in or on 'valve water-" 'closets and on the frames or stools thereof.'"

Instead of making the valve and its seat conical, "I make its " shutting surface, as well as the end of the bed, tube, cylinder, " or seat against which it shuts, (and which is affixed to the " bottom of the pan,) completely flat, and I grind these two flat " surfaces separately on a lap" "until they are sufficiently true " to form an air and water tight joint." In place of using wood " I make my frame or stool of cast iron or other metal, and " entirely in one piece."

[Printed, 4*d*. No Drawings. See Rolls Chapel Reports, 8th Report, p. 113.]

A.D. 1819, November 18.—N° 4410.

BOREL, LOUIS FAUCHE.—(*A communication.*)—"The moveable " and inodorous conveniences."

These are "composed of an upper receiver and a lower receiver, " both placed lower than the seat of the privy, and so adapted " to the place (or the place to them) that they may be removed " from time to time when full, and replaced by others, without " any discharge of mephitic or offensive vapours." "The said " upper receiver (which is placed over the lower receiver) receives " all the matters, whether liquid or more solid, transmitted " through the aperture in the seat in the privy, but retains only " *the more solid, allowing* the urine and watery matters to pass "off through strainers, which convey the liquid to the lower "receiver." The liquids are thus separated from the solids and each is stored up in a receiver (which may be a tub or barrel) that is easily exchanged for an empty one without "any unnecessary diffusion of the effluvia."

The drawings show two barrels, one beneath the other, in connection with the soil pipe. The upper barrel is upright, and receives a "shifting pipe" at the lower end of the soil pipe; this barrel is furnished with strainers in the form of vertical tubes with perforated sides. The liquid runs down the insides of these tubes into a funnel placed in the bunghole of the lower barrel. The shifting pipe has flexible sides, which are compressed together during the removal of the barrels, to render the use of the water closet continuous and independent of the removal.

Water seals and tallow, or other soft kind of luting, are used to prevent the effluvium from entering the privy, and covers, bungs, and other mechanical contrivances are applied to the receivers, during removal, for the same purpose.

[Printed, 8*d.* Drawings. See London Journal (*Newton's*), vol. 1, p. 276.]

A.D. 1821, October 18.—N° 4595.

HAWKINS, STEPHEN.—"Improvements or air traps for privies, "waterclosets, close stools, chamber conveniences, and other "purposes to which the same may be applicable."

This invention "consists in the adaptation of a self-acting valve "for the purpose of closing the aperture immediately after the "soil or water has passed through the conductor."

The drawings represent the basin of a water closet, to the bottom of which the improved air trap is attached. The dish of the trap rests upon or forms the longer arm of a lever. "The dish is "made with a smooth flat surface within, so as to meet exactly "the edges of the lower part of the basin or conductor." The fulcrum supporting the lever is attached by bolts to the bottom of the basin. On the other side of the fulcrum to the dish is a counterbalance weight, "by which the dish is pressed upwards, "and kept in contact with the throat of the conductor." When soil or water is deposited into the basin, its weight falling upon the trap at bottom, overcomes the counterbalance weight, and presses the lever down, by which the trap or valve opens, and the soil and water immediately descend through the pipe of a descending trunk to be placed below. "The edges of the dish "must be turned up sufficiently to form a vessel capable of holding a small quantity of water, for the purpose of producing a "water valve, by which the aperture may be kept air-tight."

The drawings show this trap adapted to a close stool, to a drain, to a sink hole, and to a ship's water closet.

[Printed, 6*d.* Drawing. See London Journal (*Newton's*), vol. 3, p. 287.]

A.D. 1824, March 27.—N° 4931.

JORDAN, Edward.—"Improvement or improvements in the "form or construction of waterclosets, or of the apparatus con"nected therewith."

Instead of employing valves and metal wires or rods in connection with cranks, for opening and closing the communication between the supply cistern and the pan, the inventor employs a three-way cock; this is made to open or close the said communication by its plug being caused to make a sixth part of a revolution or thereabouts, by means of levers and connecting rods worked by a handle, by depression of the seat, or by a motion communicated from the lid or cover.

Another improvement consists in the use of a secondary or intermediate reservoir, which it is preferred should be air-tight, and fed from a cistern that is placed at a great height from the said reservoir, so that when a communication is established between the supply cistern and the reservoir, the water pressure may compress the air therein, and enable the charge of water to be impelled into the pan with the necessary force. The depression of the seat causes the cistern and reservoir to be in communication, by means of the the three-way cock, and the charging of the reservoir, together with the compression of the air therein, goes on during this depression. The rising of the seat opens communication between the reservoir and the pan; the water then rushes into the pan, and removes the soil through the stink trap to the soil pipe to be carried off.

When the cistern is not sufficiently elevated to compress the air, the reservoir is placed as high above the cock as circumstances will permit; it is open (by means of a pipe) at the top, and the pipe serves also as a waste pipe to the cistern. The cock is made long enough to permit of a lengthened opening being cut in the plug.

[Printed, 6*d.* Drawing. See Repertory of Arts, vol. 1 (*third series*), *p. 180; and London Journal* (*Newton's*), vol. 9, p. 350.]

A.D. 1824, May 6.—N° 4948.

VINEY, James.—" Improvements in and additions to water-" closets."

The chief of these improvements consist in constructing the soil pipe at a very sharp angle, so as to admit of a rapid exit for the soil and water from the basin, and also in the arrangement of a " sliding door," placed vertically, to retain water in the basin, and in the combination of parts " whereby the water is admitted " into a circular pipe at the top, so as more completely to wash " every part of the bason, and, at the same time, by the violent " rush which it occasions, rapidly to carry off the soil into the " pipe which communicates with the open air."

A waste pipe leads from the pan into the open air, by which means the closet is kept clean and sweet. A casing of tin is placed over the sliding door, surrounding the same, and this also has a small pipe leading into the open air, " so as to draw off " any possible effluvia that might arise."

[Printed, 10d. Drawings. See London Journal (*Newton's*), vol. 10, p. 140.]

A.D. 1824, October 14.—N° 5019.

MARRIOTT, Henry.—" An improvement on waterclosets."

This is a portable water closet. The supply of water is contained in a chamber adjoining the basin. The drawing up of the handle simultaneously opens the valve or pan under the basin, and raises a pump piston. When the handle is pressed down, a charge of water is forced into the basin, and the valve which retains the water in it is closed. The soil passes into a chamber beneath the basin. This chamber, the basin, the pump, and the water-cistern, are all contained within one framework. What the patentee claims as novel is a sliding rod acting upon a lever or inclined plane, so as to open and shut the valve under the basin, and the combination of the several parts.

[Printed, 6d. Drawing. See London Journal (*Newton's*), vol. 10, p. 229.]

A.D. 1825, February 19.—N° 5101.

BEACHAM, John.—" Improvements on waterclosets."

These improvements " consist in a method of working the " valve through while the soil and water is discharged by means " of a spring barrel and its appendages." The spring barrel is placed under the valve, and when the valve is sufficiently weighted *with soil and water* to counterbalance the spring, the valve opens and allows the passage of the contents of the basin. The reaction of the spring then closes the valve.

[Printed, 6*d*. Drawing. See London Journal (*Newton's*), vol. 10, p. 197; Engineers' and Mechanics' Encyclopædia, vol. 2, p. 856; and Register of Arts and Sciences, vol, 3, p. 125.]

A.D. 1825, June 18.—N° 5187.

DOWNTON, Jonathan.—"Improvements on waterclosets."

These improvements "consist in removing soil, foul air, and "water from the pan or basin of a watercloset, and admitting "fresh air and water into the same, by means of a pump attached "or applied thereto, and also in placing the feed cock inside of "the said pan or basin."

The drawings show the pan and pump mounted in the same framing, together with valves, feed pipe, levers, and waste or soil pipe. A pipe leads from the bottom of the pan to the bottom of the pump, and contains two valves, an exit valve from the basin and an entrance valve to the pump. In the waste pipe, which may proceed in any direction, is another valve to prevent the return of the soil which has once been forced into the waste pipe. The upper part of the force pump communicates with the pan and with the waste pipe respectively by means of a pipe fitted with a valve.

When the handle or lever of the force pump is raised, the contents of the pan are drawn into the lower part of the cylinder of the pump, and the foul air above the piston (previously derived from the basin) is forced into the waste pipe. On the descent of the handle, the soil and foul water are driven out of the pump cylinder into the waste pipe, and the space above the plunger or piston is supplied with air from the pan, which is supplied with fresh air by means of a pipe and valve communicating with the external air. The handle of the pump has a double crank movement, which turns the feed cock to the inside of the pan, so that the upward movement of the piston is accompanied by the opening of the cock, and the cock is shut when the piston descends.

[Printed, 6*d*. Drawing. See Repertory of Arts, vol. 2 (*third series*), p. 433; also vol. 12 (*new series*), p. 105; London Journal (*Newton's*), vol. 11, p. 306; Register of Arts and Sciences, vol. 4, p. 260; Engineers' and Mechanics' Encyclopædia, vol. 2, p. 857; Webster's Reports, vol. 1, p. 565; Webster's Patent Law, p. 58 (also p. 139, case 146); Carpmael's Reports on Patent cases, vol. 2, p. 522; and Billing on Patents, p. 125. Extended for five *years.*]

A.D. 1826, August 25.—N° 5408.

DOWNE, WILLIAM, senior.—" Improvements in waterclosets."

This invention relates to self-acting water closets, namely, to those that act by the depression of the seat.

In this invention certain machinery is used, by means of which proper time is afforded for the pan or pan valve to become well cleansed by the falling water from the cistern, and to be shut so as to retain a sufficient quantity of clean water within it. The said machinery consists of a lever with adjusting weight thereon, and having a catch at its other extremity, also of an arm, pushing rod, and pulling rod in connection with the lever, and by which it is set in motion, the seat being connected to the pushing rod, and a hinged floor board being fastened to the pulling rod. A lever tumbler with inclined planes turns in bearings attached to the " container," or box immediately under the pan, and, by means of a slotted crank, acts upon the pan valve, on the prolonged axis of which is a toothed quadrant with counterbalance weight. In a bearing fixed to the container is the axis of a pinion, which also carries a ratchet wheel and fly wheel.

On the depression of the seat, the lever brings its catch downwards, and a roller at the bottom of the catch descends an inclined plane at the top of the tumbler, thus being enabled to swing under the tumbler, so as to raise it when the seat rises. Upon the seat rising, the catch raises the tumbler and then lets it go, allowing the pan valve, which is then completely open, to be closed gradually by means of the wheel mechanism in connection with the fly-wheel arrangement, thus providing for the cleansing of the pan before the pan valve is closed.

[Printed, 10*d*. Drawing. See Repertory of Arts, vol. 6 (*third series*), p. 180; London Journal (*Newton's*), vol. 2 (*second series*), p. 196; Register of Arts and Sciences, vol. 2 (*new series*), p. 251; Engineers' and Mechanics' Encyclopædia, vol. 2, p. 855.]

A.D. 1827, July 12.—N° 5521.

SHENTON, JOHN SNELSON. — " Improvements in the mechanism of water-closets."

The valves of the water closet comprised in this invention are opened and closed " by the act of a person sitting down and rising " up from the seat."

The principal mechanism consists of a vertical bar and catch lever, which act upon the pan at the bottom of the basin, so as to open and shut the said pan at the proper times. By means of levers, the service box is filled during the depression of the seat, and a float is thereby raised; this float acts through rods and levers upon the said catch lever, so as to regulate the flowing of water into the pan when the seat rises.

The depression of the seat raises a counterbalanced lever, which places the said vertical bar and catch lever in a position to be ready to open the pan. The filling of the service box and the raising of the float is also accomplished by means of the counterbalanced lever, in connection with other levers. When the seat rises, the water from the service box washes the pan, the pan is at the same time opened, and is closed gradually by the action of the float upon the catch lever, through certain rods. When the pan is raised or closed, the water is still flowing into it, and it continues to flow for a sufficient time to produce a water seal, which prevents "any effluvia from passing from the pipe or vessel " below into the apartment."

[Printed, 6*d*. Drawing. See London Journal (*Newton's*), vol. 1 (*second series*), p. 84.]

A.D. 1829, September 23.—Nº 5852.

TYLER, HAYWARD.—"Improvements in the construction of " waterclosets."

These improvements relate to the arrangement and construction of the valves employed to retain water in the basins, and which, when opened, permit the passage of the soil. According to one arrangement, a "circular turning valve" is employed. This is a flat circular plate of metal, the upper surface of which is accurately fitted to the under surface of a plate affixed to the bottom of the basin. There is an aperture in the circular plate corresponding to the outlet from the basin. When the circular plate, which moves on a pivot fixed on one side, is turned on that pivot, the two apertures are brought into contact and a clear passage is left for the soil to descend into the trap. The reverse movement closes the passage and retains the water which, meanwhile, has flowed into the basin through the supply pipe. In another arrangement a "saucer valve" is employed. This is hinged underneath the basin, and when shut presses against a seat of leather surrounding the aperture at the bottom of the basin.

This valve is retained in the horizontal position by a loaded lever, and is opened by mechanism "very similar to what is used in "pan closets."

[Printed, 1*s*. Drawing. See London Journal (*Newton's*), vol. 9 (*second series*), p. 213; and Register of Arts and Sciences, vol. 4 (*new series*), p. 162.]

A.D. 1834, August 12.—N° 6656.

GAUNT, Thomas.—"An improvement in earthenware pans or "basins of waterclosets, and certain other earthenware vessels to "which such improvement is applicable."

This invention is applicable to the earthenware pans or basins of water closets, also to "earthenware pans or basins of close "stools or night chairs, and to earthenware chamber pots or "utensils, and to an earthenware vessel or slop pail," which last the inventor calls a "closetiere."

The said improvement "consists in an improved groove or "channel formed externally around and near to the upper edge of "such earthenware pans, basins, or vessels respectively to contain water or other liquid, and into which grove the rim of a "moveable lid or cover is to descend, so as to be sealed by the "water, and prevent the escape of effluvia, as also in attaching a "false rim to such vessels." The said vessels are, by preference, made "of a circular form, but in other respects, except as to the "groove or channel aforesaid, of any form that such vessels "respectively are now or may be made."

The drawings show the above-mentioned vessels with the said groove, the exterior edge of the groove being lower than its interior edge, and there being holes half way up the groove that communicate with the interior of the vessel, and thus enable the water to be at a certain height in the groove. In certain cases a handle may be affixed to the groove. The false rim is made of wood, and may be fastened on the upright edge of the vessel by means of studs; drop rings on the shifting rim pass over the studs, and fasten the rim securely to the vessel.

[Printed, 10*d*. Drawing. See London Journal (*Newton's*), vol. 7 (*conjoined series*), p. 310; and Rolls Chapel Reports, 7th Report, p. 154.]

A.D. 1835, May 13.—N° 6836.

ODY, John.—"An improved construction of waterclosets."

"The essential character of that improved construction being "that an additional water cistern is applied to retain water "around the outside of the basin of the watercloset, having a

" suitable aperture or apertures around the neck, at the lower " part of that basin, to form a free communication for the water " to flow from the said retaining cistern into the interior of the " basin, or the contrary way, in order that the water contained " in such retaining cistern may rush down through the discharg- " ing valve whenever the same is opened, and also that the " falling and rising of the surface of the water in said cistern is " caused by means of a floater to open or shut the stop cock or " valve in the water pipe which conveys the usual influx of water " into the basin, independently of the opening or shutting of the " discharging valve at the bottom of the basin."

The discharging valve acts in the ordinary way by means of a handle, pull-up rod, and loaded lever.

[Printed, 1*s*. Drawing. See London Journal (*Newton's*), vol. 14 (*conjoined series*), p. 228.]

A.D. 1836, April 23.—N° 7068.

FINDON, James.—" Improvements in apparatus for supplying " water to waterclosets."

According to this invention, the service box is secured to the cast-iron chamber on which the basin is fixed, and the basin is supplied with water therefrom by means of a cock near the seat. One action works the pan for getting rid of the water and soil, and actuates the cock for the supply of fresh water to the basin.

The movement of the pan is made by means of the usual handle, lever, and crank arm, and the axis of the pan projects through the cast-iron chamber, to receive a crank arm which is connected by a bar with the arm of the cock. The service box is furnished with two pipes, which enter the basin through its back; one of these is an air pipe, when the cock is shut, to enable the other pipe to give the after supply of water which is to remain in the basin. If the cock be placed at the other side of the apparatus another lever is used to actuate it from the pan axis.

A self-acting water closet, or one that acts by the depression and subsequent rising of the seat, may be made to connect the action of the pan with the supply cock.

[Printed, 10*d*. Drawing. See Repertory of Arts, vol. 7 (*new series*), p. 9.]

A.D. 1837, July 7.—N° 7398.

ROE, Freeman.—" An improvement in waterclosets."

The object of this improvement is to apply the water entering the basin in the most effective manner. This is attained by forming a recess or channel round the upper part of the basin. The water enters this recess, and issues from it so as to sweep the entire surface, when the pan has been opened to allow the disdischarge of the soil. Water is also supplied by the ordinary distributing plate, during the time that water is flowing in from the water-supply pipe. After the pan has been closed and the water supply shut off, the water remaining in the recess passes into the basin, and forms a water joint between it and the pan.

[Printed, 10*d.* Drawing. See Repertory of Arts, vol. 9 (*new series*), p. 211; Mechanics' Magazine, vol. 30, pp. 83, 104, and 248; and Engineers' and Architects' Journal, vol. 1, pp. 141, 171, and 403; also vol. 5, p. 174.]

A.D. 1837, July 10.—N° 7401.

CHUBB, WILLIAM.—"Improvements in night commode pans."

This invention relates:—

1st. "To that class of earthenware night commode pans which " are usually contained and supported in frames called night " stools."

2nd. "To that class or description of night commode pans, " also sometimes called 'chamber utensils,' and 'chamber pots.'"

The invention consists, in respect to such two descriptions, of night commode pans, "in a mode of applying a water joint for " the covers, in order to prevent the escape of effluvia."

The drawings show this invention applied to a chamber utensil with one handle, a chamber utensil with two handles, and a night commode pan supported in a frame. In all these cases the top of the pan is below the top of the channel or water groove, and in night commode pans for night stools the external and higher top of the channel is the means of suspending the pan in the frame.

In the other class of night commode pans, the said top of the channel is "the means or partly the means of supporting the " person using the same."

[Printed, 10*d.* Drawing. See Repertory of Arts, vol. 9 (*new series*), p. 272.]

A.D. 1837, August 24.—N° 7421.

CRELLIN, JAMES, and HOLT, JAMES.—"Improvements in " water-closets."

The principal feature of these improvements is the dispensing with the usual service box, and the wires and cranks required to work it. The supply pipe is connected with a valve, which is opened by the same movement which opens the valve at the bottom of the basin. The closing of the valve is controlled by a float working in a box alongside of the basin. When the water in this box runs out, which occurs on the discharge of the soil from the basin, the float descends, and a lever connected with it and the supply valve causes that valve to open. When the handle of the closet is let down, water flows into this box, gradually raises the float, and at the same time gradually shuts the valve through which water is supplied to the basin. This apparatus is also applied to make the closet self-acting, that is to cause the different parts to act when the person using it rises from the seat. Another improvement is "the application of a two-way cock to the main " supply pipe of the closet, in order to admit hot or cold water " into the basin of the closet at pleasure."

[Printed, 8*d*. Drawing. See London Journal (*Newton's*), vol. 14 (*conjoined series*), p. 28.]

A.D. 1838, September 13.—N° 7810.

SWINBURNE, THOMAS.—"Improvements in water-closets and " other conveniences of the kind."

These improvements relate to closets in which the soil is not mingled with water, but is made to fall upon ashes, or some other dry substance. The construction of the apparatus differs little from that of the ordinary water closet, excepting that a small funnel is fixed immediately in front of the seat, and within the basin, for the purpose of carrying away the urine. The dry material on which the soil falls is caused to descend on the pan, and when the closet is used, to pass away through a pipe into a drain or cesspool.

The drawings also represent a water closet, that is a closet in which a bed of water is provided within a basin for the reception of the soil. In the container beneath the basin is a grating for the separation of the aqueous matter from the soil. The water can only come into the container when a slide at its bottom is down or closed. The fluid matter, after having passed through the grating passes through a separate pipe or duct, which carries it off. Ashes or suitable solid matter are supplied to the soil after it has passed through the container into a receiver. The admission of the soil to the receiver and the supply of ashes thereto are simultaneous and are accomplished by a handle and rod at the seat.

[Printed, 10*d.* Drawing.]

A.D. 1840, May 5.—N° 8494.

BEETSON, William.—"Improvements in stuffing boxes, "applicable to water closets, pumps, and cocks."

[No Specification enrolled.]

A.D. 1840, August 5.—N° 8590.

BEETSON, William.—"Improvements in water-closets and "stuffing boxes, applicable to pumps and cocks."

"My invention relates, first, to a mode of constructing water-"closets, and in such manner that the valve when closed, is an "inclined position in place of being horizontal, whereby the "handle, in opening the valve, has to be moved through a less "space to get the valve into a vertical position, and when moving "the handle to a like extent as heretofore, would cause the valve "to be moved considerably more out of the way than heretofore, "and thus ensure the better action of the valve by rendering it "less possible for paper or the soil to adhere and interfere with "the well closing of the valve when it is again shut.

"Secondly, my invention relates to a mode of rendering the "opening through which a lever handle of a pump or cock passes "and works water or fluid tight, and thus producing an improved "stuffing box."

The supply cock shown in the drawings to the water closet is similar "to what constitutes part of the second object" of the invention. The mode of rendering the opening mentioned in the second portion of the invention fluid tight, is by applying a flexible cup thereto, clamped all round at its edges.

[Printed, 1*s.* Drawings. See Repertory of Arts, vol. 15 (*new series*), p. 218; Mechanics' Magazine, vol. 34, p. 189; Inventors' Advocate, vol. 4, p. 99; and Engineers' and Architects' Journal, vol. 5, p. 174.]

A.D. 1840, November 2.—N° 8676.

ROBSON, John Wordsworth.—"Improvement or improve-"ments in waterclosets."

These improvements relate to, 1st, attaching to ships' water-closets a bed plate and tubes "through which the soil and water

" pass from the basin into the cylinder, and from the cylinder " into the soil pipe;" 2nd, employing " leathern valves, by which " vacuum is produced within the cylinder and in the valve " box or soil-pipe head and the valve box in which the valve is " contained;" 3rd, employing an " inverted conical-shaped " cylinder top, with the metal plates upon the bottom and top " thereof, and the method of working the same (so as to obviate " the necessity of a solid piston-cylinder top and stuffing box), " by creating vacuum in the cylinder without friction;" 4th, a valve tap, by " means of which water is admitted into the basin " with the tap rod, and the method of working it; 5th, a portable closet having " the valve tap by which water is admitted into the " basin, the leathern valve at the bottom of the basin, and the " method of working the said valve by a detached counter- " balance weight attached to the bottom of the lift piece;" and, 6th, the application of the foregoing and similar improvements to a house closet.

[Printed, 10*d.* Drawing. See London Journal (*Newton's*), vol. 19 (*conjoined series*), p. 432; Mechanics' Magazine, vol. 34, p. 302; and Inventors' Advocate, vol. 4, p. 245.]

A.D. 1841, March 29.—N° 8906.

LINDSAY, John.—" Improvements in covers for waterclosets, " night-stools, and bed pans."

A circular piece of wood is surrounded with a strip or strips of woollen cloth or other elastic substance. A band of chamois leather, secured at one end by hooks, is passed above this. A hole is made in any part of the board, and a peg fitted to it. " When the extinguisher is pressed down, keeping the peg out, " the air escapes through this hole, and when sufficiently low, on " putting the peg in all smell is prevented, and it is hermetically " sealed."

[Printed, 4*d.* No Drawings. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 269; Mechanics' Magazine, vol. 35, p. 316; and Inventors' Advocate, vol. 5, p. 227.]

A.D. 1841, May 27.—N° 8971.

HULME, George.—" Improvements in water-closets."

These improvements relate to the mode of supplying the basin of closets with water. Cranks, wires, and the ordinary *service box are* dispensed with. In their place an apparatus with which the supply pipe is connected, and which is acted on by the handle that works the closet, controls and regulates the flow of water into the basin. This apparatus consists of a cylinder and piston. When the piston is depressed the water-way is open. The ascent of this piston closes the water-way, and this ascent is rendered gradual by the pressure of fluid on the sides of the piston being adjusted.

[Printed, 8*d*. Drawing. See Mechanics' Magazine, vol. 35, p. 447; and Inventors' Advocate, vol. 5, p. 357.]

A.D. 1842, March 1.—N° 9272.

SMITH, THOMAS.—" An improvement or improvements in " waterclosets."

In addition to the usual pipe communicating with the service box, a secondary service pipe is connected with the trap. When the valve is raised, the water rushes through these two pipes into the basin and trap, " so that the contents of the basin are no " sooner carried down into the trap by the main stream of water " than they are driven forward by the secondary stream from the " back of the trap into the discharge pipe, and any detention or " deposit is thus effectually prevented." The trap is short and sharply curved, and is thus capable of being fixed without cutting away the flooring. A small door at the top gives access to the trap to clear away obstructions.

[Printed, 6*d*. Drawing. See Mechanics' Magazine, vol 37, p. 278; and Record of Patent Inventions, vol. 1, p. 63.]

A.D. 1843, June 6.—N° 9758.

FARMER, RICHARD, and PITT, JOSEPH.—" Improvements " applicable to fixed and portable water-closets and beds or " bedsteads, a part or parts of which improvements are also " applicable to raising and forcing water."

These improvements relate to :—

" First, the construction of a stationary water-closet, in which " the various moving parts are actuated by the sliding of a lid or " cover over the seat board of the said water-closet.

" Secondly, the construction of a portable water-closet, in which " a pump (whether rotary or otherwise) is made to force a stream " of water into the basin by the shutting down of the lid or cover " of the said portable water-closet.

"Thirdly, the construction of a rotary pump by the revolution " of a plate or diaphragm in an elliptical chamber, such plate or " diaphragm being carried round by the rotation of an axis situated " eccentrically to the axis of said elliptical chamber.

"Fourthly, the method of tightening the sacking of beds or " bedsteads," "by rolling up the said sacking on one of the side " rails of the said bedsteads, and securing the same by pins or " cotters; also the application of the same method of fastening " by pins or cotters to the supporting or securing our improved " rotary pump to a cistern or reservoir."

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1843, July 20.—Nº 9846.

AUSTIN, Henry.—"Improvements in the construction of " waterclosets."

One of the water closets shown in the drawings has its seat working on pivots at its sides, so that the weight of the person using the closet causes the seat to ascend at the back, thereby forcing upwards a heavy vertical rod, connected to a lever which then brings down a valve in the service box, so as to open the communication between the supply cistern and the service box, and at the same time to close the discharge tube. On the rising of the seat, the heavy vertical rod falls, the end of the supply pipe is closed, and the discharge tube is opened, when the whole body of water confined in the service box immediately rushes down into the basin. The sectional area of the discharge tube is much larger than in those in ordinary use, so that the whole weight and power of the water is brought to bear on the basin and trap or pan at once. The distributor in the basin is so formed as to allow the free passage of the water; its sectional area is exactly equal to the capacity of the pipe to the basin. When the usual pan is attached to the basin, a counterbalance weight enables it to discharge the soil and then to return to its original position. The valves for the supply of water from the service box are worked from below the said service box.

In another water closet, where the level of the supply will not allow of a fall, the rush of water is ensured by means of a piston which descends in the first instance below certain openings in its box or cylinder, thereby allowing the space above the piston to fill with water which is afterwards forcibly expelled by a counterbalance weight to the piston.

[Printed, 6*d*. Drawing. See Patent Journal, vol. 3, p. 158; and Engineers' and Architects' Journal, vol. 7, p. 60.]

A.D. 1844, March 14.—N° 10,104.

BROWNE, JOHN.—" Improvements in urinal utensils."

This invention "relates to applying apparatus to chamber and " similar urinal utensils, for silencing the fall of water when such " utensils are used, and the apparatus so applied also serves as a " cover to close the contents from sight."

In constructing chamber utensils according to this invention, there is preferably an interior ledge to receive the silencing plate. The silencing plate is so formed that as the water falls thereon, it will flow down the convex surface thereof, and will descend on the ledge or projection around the interior of the utensil, and thus silently flow into the utensil; the under surface of the silencing plate is formed with knobs or projections and, in plan, it has corrugations, so that the water will readily pass to the interior of the vessel.

A stand for the utensil is shown in the drawings; this is capable of adjustment as to height by means of a screw.

[Printed, 8*d*. Drawing.]

A.D. 1844, September 26.—N° 10,328.

CLARK, THOMAS.—" An improved domestic convenience."

The chief points of novelty in this water closet are, 1st, the application of a balanced valve to close the aperture at the bottom of the basin; 2nd, the coating of the inner sides of the metal of which the machine is composed " with enamel or matter " suitable to effect the complete resistence to the penetration of " liquids or moisture," and, 3rd, the fastening of the lid by means of a bayonet joint, the surface of the seat being faced with " cloth, gum, caoutchouc, or other suitable matter or substance."

[Printed, 6*d*. Drawing. See London Journal (*Newton's*), vol. 26 (*conjoined series*), p. 250.]

A.D. 1844, October 22.—N° 10,363.

POOLE, MOSES.—(*A communication.*)—" Improvements in ma" chinery for emptying privies and cesspools."

The principal heads of this invention are:—

1st. "The use of an endless chain of cups, with suitable "apparatus for working the same, for emptying privies and such "like places."

2nd. A "mode of disinfecting the mephetic or noxious gas "arising from such matters."

3rd. "Enclosing the apparatus in such manner as to prevent "the escape of any odour during the operation of emptying "privies and other such places."

4th. The arrangement of certain horizontal and vertical jacks, to obtain any required inclination of position for the endless chain of cups mentioned under the first head.

The endless chain of cups is mounted in a framing, and its upper part passes over two hexagonal drums, one of which is a driving drum, the axis of which is connected to the handle of the machine by a spur wheel and pinion. In working, this appatus is "placed over the hole of the place from whence the matter "is to be extracted." A length of rods proceeds downwards, nearly to the bottom of the place, to support a lower guide roller for the chain, which is adjustable in length and inclination by means of horizontal and vertical racks and click wheels, or jacks.

The apparatus above ground is enclosed by a wooden cover, over which is placed metallic cloth, and over the cloth is placed a zinc casing. The apparatus being properly fixed, the drums are rotated by the handle and the cups on the chain caused to ascend with soil on one side and, having delivered their contents into a receptacle, to descend empty on the other side. From the receiver the soil passes through a flexible tube and valve to a tub. From the tub an air pipe passes to a disinfecting arrangement; the purified vapour then passes into the atmosphere.

[Printed, 10*d*. Drawing.]

A.D. 1845, April 10.—Nº 10,608.

STOCKER, Samuel.—"Improvements in machinery or appa"ratus for lifting, forcing, or conveying liquids, in vessels for "holding liquids, and improvements in waterclosets."

The portion of this invention which relates to "improvements "in constructing watercloset basins, and apparatus connected "therewith," is as follows:—

The basin is formed "of china or earthenware, so that the

" basin and pan (or vessel forming a water joint at the lower end " of the basin) may be all in one piece."

Another improvement is, the use of an external vessel to basins having fixed pans.

"At the lower end of the basin is an opening," "so that the " water and soil may be washed out of the pan, such opening being lower than the depth of the pan, so that the water remaining in the pan may close the opening."

The said external vessel is of earthenware, and is fixed by a putty joint or other convenient means to the soil pipe, and the basin is placed on this vessel and closed tight by a putty joint.

The water is supplied to the basin and pan by one water-way forming part of the basin. From the water-way a pipe (also a part of the basin) descends to the bottom of the basin; to this pipe there are two openings, one to the spreader at the top of the basin, the other to the bottom of the pan. The simultaneous admission of water at the top and bottom, of which this construction permits, washes the upper part of the pan as well as the lower part; thus the soil is carried off, and a sufficient quantity of clean water is left in the pan. The drawings show a flange, turned downwards, at the top of the basin, and an opening for a cock in order to introduce a wire to cleanse the pipe that proceeds to the bottom of the pan.

[Printed, 2*s*. 2*d*. Drawings.]

A.D. 1846, April 15.—N° 11,164.

BUNNETT, Joseph.—"Improvements in waterclosets, part " of which improvements is applicable to other useful pur-" poses."

1st. "An improved watercloset for ships to be used below the " level of the external water line." The basin is supported upon a flanged elbow-piece which is bolted to a horizontal pump barrel terminating in a delivery piece. Within the elbow-piece there is a valve opening towards the pump barrel. Within the pump barrel there is a piston furnished with a valve opening towards the delivery end of the pump; this piston is worked by two horizontal piston rods passing through stuffing boxes. On the upper part of the delivery piece there is a valve opening outwards towards a second delivery piece, to which the soil pipe is attached.

by a screw. The soil pipe may deliver its contents either above or below the water line. From the handle of the water closet a series of levers and cranks communicates motion to the piston of the pump, which by means of its own valve in connection with the valves already mentioned, expels the soil. At the same time a rod (also in connection with the handle) turns a cock which admits water to the basin. If the seat is less than two feet below the level of the external water line, a small force pump is worked by the handle and drives the water up the reservoir pipe to the requisite height.

2nd. "An improved form of watercloset for ships to be fixed "in situations that are above the level of the external water "line." The rising of the handle lifts the piston of a pump and fills it with water at the same time that the soil is discharged by means of the pan valve. On depressing the handle the pan valve closes and the contents of the pump are forced into the basin. The pan valve is counter-balanced and is closed by the central pressure of a lever.

3rd. "A portable watercloset for the use of invalids." The action of this closet is the same as that described under the 2nd head. The pan valve is shut by the central pressure of a weighted lever. The receiver is connected to the closet by means of inclined planes.

[Printed, 10*d*. Drawing. See Patent Journal, vol. 2, p. 493; and Engineers' and Architects' Journal, vol. 10, p. 144; and vol. 12, p. 119.]

A.D. 1846, May 26.—N° 11,218.

WILKINS, John Walker.—"Improvements in water-"closets."

The drawings show an arrangement having a basin, receiver, plug, and soil pipe. The plug is worked from the seat by a handle and levers. The water supply is from a small cistern at the side, which is kept constantly full by means of a pipe from the main controlled by a ball cock. A pipe from the small cistern to the bottom of the basin has a valve to prevent the inflow of water to the cistern; whenever the plug is closed, the water in the basin rises to the same height as that in the cistern. The basin may also be cleansed from the top, through a fan or spreader, by means of a cock on a branch from the main pipe worked by a separate handle and rod from the seat. The soil pipe is trapped, and has an air pipe leading from it at the upper part of the bend into the external atmosphere. Instead of the passage between the basin and receiver being closed by a circular plug, a slide valve arrangement may be used for this purpose.

The peculiar arrangements of this water closet, in respect to the plug or slide valve and to the above-mentioned air pipe, conduce to the absence of all noise during its operation, it is therefore called the "silent water-closet."

[Printed, 6*d.* Drawing.]

A.D. 1846, November 19.—N° 11,456.

ASHE, William.—"Improvements in cleansing privies, sewers, "and drains."

This invention "consists of an apparatus suspended on axes "to collect water, and from time to time to flush and thereby "cleanse privies, sewers, and drains." The invention "is applicable in those cases where small streams or supplies of water "can be obtained, and which, if continuously running into a "privy, sewer, or drain, would have comparatively little effect in "cleansing the same."

The drawings show sections of a privy having this invention applied thereto. An earthenware cone or basin, with a water supply pipe and a spreader, is fixed under the seat. A chamber, in connection with the supply pipe, has at its upper part a shoot, vessel, or cistern, mounted on axes and with stops on either side to prevent it moving except in one direction. The part of the chamber underneath the cistern "is made with inclined sides so "as to conduct the water to the cone" "under the seat and thus "flush it out." A small stream of water being conducted into the cistern, "it will from time to time become filled, and when "full it will turn partly over and discharge the water suddenly, "and thus flush out the cone or basin of a privy, or it might "be of a drain or sewer, thus obtaining from time to time a "sudden flushing of water."

[Printed, 10*d.* Drawing. See Patent Journal, vol. 3, p. 2.]

A.D. 1847, June 3.—N° 11,728.

JENNINGS, Josiah George.—"Improvements in water-"closets, and making joints and connections of pipes."

1st. "Improvements in valves of water-closets." The pan valve is so arranged that, when acted on, it first descends a short distance and then quickly recedes; as it goes back and returns, the valve moves against a brush and is cleansed. This valve is acted upon by the handle of the water closet through levers. To the under part of the valve is affixed a plate, to which a lower plate is connected by means of connecting links that are capable of moving on centres. The lower plate is affixed to a horizontal rod in the valve box that passes through a stuffing box. Horizontal guides on which a slotted upright (attached to the valve rod) moves, enable the levers in connection with the handle to act upon the valve in the above-mentioned manner. When the handle is liberated, a weight on an arm tends to replace the valve rod and valve in their original places. An overflow pipe from the basin, in connection with a small cistern, supplies water to the brushes.

Two kinds of valves for supplying water closets with water are described and shown, one acted upon through a lever from beneath, the other lifted by the top of the spindle. The valve itself is composed of a plate with a facing of leather, and the sharp edge of a vertical cylinder or pipe forms the seat. In each case the stem of the valve has a fixed collar, against which the leather washer can be screwed by means of the above-mentioned plate. These valves may be re-leathered with facility.

2nd. "Improvements in making joints and connections of "pipes."

[Printed, 1*s*. 2*d*. Drawings. See Repertory of Arts, vol. 11 (*enlarged series*), p. 247; also Patent Journal, vol. 4, pp. 51 and 60; vol. 6, p. 222; and vol. 8, p. 160.]

A.D. 1848, April 27.—N° 12,140.

SALTER, ROGER GEORGE.—"Improvements in carts for the "distribution of liquid substances, and in the construction of "sewers, drains, and cesspools, and in the cleansing of the "same."

The portion of this invention which is applicable to flushing cesspools and water closets is as follows:—

A self-acting flushing apparatus is attached to sewers, drains, cesspools, or other similar conduits and receptacles, whereby the liquid passing along or through the said conduits or receptacles is pent up or retained therein at certain places, until it attains such a height as to flow over into and fill one or more basins suspended in chambers constructed outside, inside, or at the top of the said conduits or receptacles, on the filling of which basins or vessels they drop down and thereby open a valve, by which the pent-up liquid "is released, and rushes out with a velocity equal " to the height and quantity of the fluid."

The drawings represent a self-acting flushing apparatus in a chamber on the outside of the receptacle. When the liquid rises to acertain height in the receptacle, it overflows through an overflow pipe into the suspended basin, and when that basin is full it drops down, raising the other end of the suspending lever, and removing a stopper from a large valve connected with the receptacle; the liquid then rushes out.

In one application of the invention especially applicable to a cesspool which is supplied with a definite amount of water from a public water-works, the rising of the fluid matters therein acts upon a float or ball, so as to admit water into the suspended and balanced basin, and thus to raise a lever arm, and remove a plug from the bottom of the receptacle, whereby the contents are discharged. The basin has only an aperture at the top and therefore the time of efflux of the water therefrom may be regulated.

[Printed, 1*s*. 4*d*. Drawings. See Mechanics' Magazine, vol. 49, pp. 503 and 540, also ,vol. 51, p. 401; Artizan, vol. 7, p. 82; and Patent Journal, vol. 6, p. 65.]

A.D. 1848, December 2.—N° 12,350.

ARMSTRONG, JOHN.—"Improvements in constructing water " closets."

This invention consists in the vertical arrangement of the side valve to the basin, and in the parts connected therewith.

Instead of the valve face being horizontal and making contact with the vertical opening at the bottom of the basin, it is vertical, and makes contact with the horizontal part of a curved tube connected to the bottom of the basin. The valve is hinged to the inside of the valve box; the pulling rod connected to the handle passes through a stuffing box in the valve box, and works vertically up and down therein by means of an internal slide. A link connects the termination of the said rod to the valve by means of a slotted quadrant fixed on to the said valve. The pulling up of the rod opens the side valve, and the valve is shut by its depression. The rod is also used to work a crank "in

" connection with ball lever at cistern " so as to supply water to the basin in the usual manner.

The valve is made of brass, and its face bears up against a gutta percha washer secured to the discharge pipe.

[Printed, 10. Drawing. See London Journal (*Newton's*), vol. 34, (*conjoined series*), p. 401; Mechanics' Magazine, vol. 50, p. 543; and Patent Journal, vol. 7, p. 119.]

A.D. 1849, February 8.—Nº 12,465.

TOOTH, WILLIAM.—" Improvements in waterclosets and in " chimney pieces, in machinery for the preparation of clays and " other materials, and in the manufacture of earthenware " articles."

The improvements relating to water closets are :—

1st. Constructing the discharge valve at the bottom of the basin, so that its closing surface shall, in use, slide or rub against the valve seat.—In one instance the valve is a conical plug of large size, similar to the plug of an ordinary plug tap, disposed transversely to the direction of the vertical discharge pipe, and worked by a crank attached to the pulling rod. In another instance, the discharge pipe is bent into a horizontal direction, and a hollow conical plug is applied thereto. A syphon is used with these and certain other valves to carry off the superfluous water from the basin; it joins the basin above the valve to the soil pipe. A cylindrical valve, a disc valve, and a plate valve are also described and shown.

2nd. Conically or spherically faced discharge valves.—Some of these valves are worked direct from the handle and rod at the seat, some have intermediate springs and levers, and in one, the seat handle is itself a lever, and pulls the valve away from its seat.

3rd. Constructing basins with a slanting discharge tube.—This is necessary in some of the valves mentioned above.

4th. The discharge valves act against an oblique termination of the bottom of the pan or pipe in continuation thereof.

The basins, pans, oblique connecting pipes, discharge pipes, plugs, and valves are made of earthenware or of glass. Where valve casings are used, these may be made of earthenware or of glass.

[Printed, 2*s*. 4*d*. Drawings. See Mechanics' Magazine, vol. 51, p. 141; and Patent Journal, vol. 7, p. 216.]

A.D. 1849, June 26.—N° 12,673.

GRAY, Thomas Wood.—"Improvements in waterclosets, "pumps, cocks lubricators, and deck lights."

"A semi-spherical pump."—The drawings show an induction chamber, with valves opening outwards and upwards, leading into a vertically-divided hemispherical chamber, one of the said valves leading to one division, the other to the other division. A "circular flapper," or oscillating piston is mounted in each division of the hemispherical chamber and attached to the same axis which passes through the centre of the said chamber; each flapper has its valve opening upwards. The cover to the hemispherical chamber has two valves opening upwards into an air chamber which carries the nozzle or spout of the pump; there is one valve to each division of the hemispherical chamber. On the rising of one of the circular flappers, the water ascends from the induction chamber into the space thus left vacant; at the same time the water above the flapper is expelled through the cover valve into the air chamber. On the descent of the flapper, only the valves thereon act to take the water in the hemispherical chamber above the flapper; one flapper descends while the other ascends.

"A horizontal flapper pump."—The valves in the induction and education chambers are arranged similarly to those of the "semi-spherical pump." The vacuum chambers that alternately raise the water consist of flat plates or flappers, to the edges of which and to the bed plate vulcanised india-rubber sheets are secured. The two flappers work from the same centre. A cylindrical vacuum chamber is also shown.

A "spherical pump watercloset."—The valve at the bottom of the basin leads into a soil chamber, whence the soil is removed to the eduction chamber by means of a "semi-spherical pump" as described above, but with only one flapper. The handle lever is slotted, and works a crank on the flapper axis. A cylindrical vulcanised vacuum chamber may be used instead of the "semi-"spherical pump." A "horizontal flapper pump," similar to that described above, is also shown, in the drawings as applied to water closets.

[Printed, 2*s*. Drawings. See Mechanics' Magazine, vol. 51, p. 619; Artizan, vol. 8, p. 56; and Patent Journal, vol. 8. p. 174.]

A.D. 1849, September 20.—N° 12,784.

MARSDEN, Charles.—" Improvements in traps to be applied " to closets, drains, sewers, and cesspools."

This invention consists in the construction of the said traps " of a drum or series of buckets caused to revolve by the weight " of the matters falling into the same, and made air-tight by " overhanging and side flaps of vulcanised caoutchouc or other " suitable substance."

This invention also consists in " the forming of the discharge " aperture of the closet pans of an oblong form rounded at the " ends."

The drawings show the said drum working on centres that are fixed to the under part of a water closet basin. This trap is in the container or case upon which the basin is placed; it is shown with four compartments or buckets, and its general outline is cylindrical. " By the adoption of this trap the soil is at once " delivered into the soil pipe without having to pass over any " bend in the pipe, which generally forms a great obstruction and " occasions a choking of the closet pipes."

The closet pan or basin terminates at the bottom in an opening of the form of an oval or oblong rounded at the ends.

It is proposed to fix a ventilating pipe at the top of the case upon which the basin is placed; this carries off the effluvia from the drain, and should terminate in some adjoining chimney or at the top of the house.

[Printed, 8*d*. Drawing. See Mechanics' Magazine, vol. 52, pp. 238 and 273; and Patent Journal, vol. 9, p. 11.]

A.D. 1850, June 4.—N° 13,097.

D'ANGELY, Paul.—" Improvements in the construction of " privies and urinals, and in apparatus and machinery for " cleansing privies, cesspools, and other places, and in deodoris" ing the matter extracted therefrom, and rendering it available " for agricultural purposes."

The chief design of this invention " is to obtain the deodorisa" tion " of every species of excreta, fæcal matter, or urine " at " the moment when it falls from the human body."

In privies, a box is placed underneath the glazed earthenware basin. The box may contain from twenty-five to fifty gallons; it is furnished with handles for removal, and with a zinc or galvanised iron lid ready to close hermetically the orifice of the point of junction between the basin and the box. Before the box is placed beneath the privy, it is partly charged with a certain deodorising fluid, that is herein-after referred to.

In urinals, a glazed earthenware basin is covered externally with zinc or galvanised iron, and it communicates with a brick reservoir by means of a tube; the said reservoir contains a certain quantity of deodorising fluid. A vertical tube, ordinarily covered by a lid, serves to ascertain when the reservoir is full, "in which "case the matter may be emptied by means of a syphon."

Cesspools may be treated with deodorising fluid, as mentioned above, and the matter is removed therefrom by means of a wooden cast girt with iron, and "filled by means of an air pump." An indicator shows when the cask is full, and an inclined plane is employed to place the cask upon a waggon, and to facilitate the emptying of the said cask.

The deodorising fluid to be used is set forth, and the method of converting the fæcal matter into manure is fully described.

[Printed, 6*d*. Drawing. See London Journal (*Newton's*), vol. 38. (*conjoined series*), p. 88; Mechanics' Magazine, vol. 53, p. 475; and Patent Journal, vol. 10, p. 278.]

A.D. 1850, July 23.—N° 13,188.

BEETSON, WILLIAM.—"Improvements in water-closets, pumps, "and cocks."

According to this invention, the basin of a water closet, the movable pan at the bottom of the basin, and the container together with the frame supporting the container, are all made of glazed earthenware. A projection on the pan joins it to certain metallic parts connected with its axis. A lever, worked by the lifting handle, juts out between two pins on the said projection and raises or opens the pan. Another plan of working the pan is by means of a crank handle affixed directly to the axis of the said lever.

Another improvement consists in facing the metal valve with glazed earthenware, or with glass, or with slate; a similar facing is placed in the valve box opposite to the opening of the valve. The valve works on a centre and is carried further back than if it be simply acted on by gravity, by means of a lever arm and roller worked by a lever in connection with the lifting handle; the valve is raised into its place by a curved projection underneath the same against which the roller presses. When shut, the valve is pressed against a gutta percha washer.

In another improvement, there is a hook-formed projection at the back of the valve which is acted upon by an arm worked by levers in connection with the crank handle. A helical spring brings back the axis of the crank handle to its original position. The container of this arrangement is made of glazed earthenware.

Another mode of working the pan is by means of an arm which presses on the pan to keep it shut; the arm is moved by direct motion from the crank handle. The pan opens by gravity when the arm is moved away.

Improvements relating to pumps and cocks are also set forth.

[Printed, 3s. Drawings. See Mechanics' Magazine, vol. 54, p. 97; and Patent Journal, vol. 10, p. 221.]

A.D. 1850, July 25.—Nº 13,195.

BELL, Charles William. — " Improvements in apparatus " connected with waterclosets, drains, and cesspools, and gas and " air traps."

This invention consists in the manufacture of collapsible passages of india-rubber connected with the above-mentioned articles.

The lower part or container of a water closet terminates in a tube in the soil pipe. To the tube of the container is fitted an india-rubber tube, " the lower part of which is made flat, and has " at all times a tendency after opening to assume a collapsed " state, and yet when pressed by fluid above, the fluid will readily " cause the collapsed part to open."

In order to make the said passages, " the best way is to take a " tube or pipe of india-rubber, and cause the part which is to " assume the collapsed state in use to be collapsed, and to be " held firmly in that form or state during the time when the " process now well known as vulcanizing of india rubber is being " performed, or the whole length may be treated in a collapsed " state, and part thereof drawn on to the tube, by which means " the collapsed surfaces will be in contact during the process, " and they will after such process retain such form or set, and, " if separated, will, when allowed to do so, assume that state or " form in which they were vulcanized, and the contact will be " such as to produce an air-tight joint."

The drawings also show a grating or trap to allow of the passage of fluids to cesspools fitted with a pipe of india-rubber, the lower part of which is collapsible. In some cases these passages may be placed in pipes so as to act as air traps.

Other uses for these passages are indicated.

[Printed, 1*s.* 4*d.* Drawings. See London Journal (*Newton's*), vol. 38 (*conjoined series*), p. 177; Mechanics' Magazine, vol. 54, p. 99; and Patent Journal, vol. 10, p. 211.]

A.D. 1850, July 31.—N° 13,204.

RISHTON, HENRY.—"Certain improvements in waterclosets "and urinals."

1st. Improvements in water closets.—These water closets may be supplied with water directly from the main or service pipes, and the cisterns and service boxes usually employed may be dispensed with. In one arrangement, the handle at the seat operates upon levers to turn a screw cock connected to the main pipe; this cock is horizontal. Regulators are placed to adjust the quantity of water admitted to the basin and to the soil pipe respectively. In another arrangement, the motion of the levers works a disc valve in an upright pipe; a hollow chamber at the top of the basin is in connection with the spreader. Another water-supply valve has only a single regulator, in which the valve is moved closer to or farther from its seat, by means of a screwed spindle; the water-supply valve, in common with those above described, has a packing formed of vulcanized india-rubber tubing. Another water-supply valve, in being opened, is screwed down from its seat, so that, when closed, it has the full pressure of water upon it. A common water closet is shown with the flushing valve, in which a bell crank acts upon the valve spindle. In another water closet, the flow of water through the pan and trap is continued during the depression of the seat. In the "economic" water closet, a ball-cock measuring cistern is connected to the pipe by which the basin is washed; the water passes into the cistern before entering the basin. An inclined valve for stopping the bottom of the pan is shown; this valve is worked from a centre and has a covering of leather to make an air-tight joint.

2nd. Improvements in urinals.—One or other of the valves described under the first head may be applied to flush urinals. The floor of the urinal is mounted on an axis and forms the lid of a box in which the levers and valve apparatus are placed; in another case, the lid of the box rises and falls vertically. The valve levers are actuated in each case by the depression of the lid; these urinals are therefore self acting.

[Printed, 2*s.* 10*d.* Drawings. See Mechanics' Magazine, vol. 54, p. 118; and Patent Journal, vol. 10, p. 222.]

A.D. 1850, December 7.—Nº 13,395.

EVEREST, John, and OSBORNE, George.—"Certain im-" provements in commodes and in fixed and portable water-" closets."

1st. Portable commodes.—One of these, when closed, represents an ottoman; when the lid is raised, arms connected therewith spring out so as to form a chair. The seat is formed with a hollow concavity at top. The pan is long and narrow, and is furnished with a valve cover surrounded or coated on its edges with vulcanised india-rubber, and fitting so tightly to the sides of the pan as to prevent any effluvium from escaping. To remove the lid, the india-rubber flap is slightly raised by means of a leather strap.

2nd. Fixed water closets.—The raising of the lid or cover is made to communicate motion to the valves and other working parts. At each downward action of the lid, links, connected therewith, operate upon a lever drop connected to the centre of motion of the pan, so as to empty the pan and allow it to regain its position very shortly afterwards. A rope or chain, also in connection with a lever, and during the downward action of the lid, works the valve of the supply cistern so as to cleanse the pan. A service box without a bottom valve is employed.

3rd. Portable water closets.—These "improvements consist in " the constructing portable waterclosets with the several me-" chanical arrangements lastly above described being adapted " thereto, the discharge or soil pipe being omitted or closed up."

[Printed, 1*s.* 4*d.* Drawings. See Mechanics' Magazine, vol. 54, p. 478; and Patent Journal, vol. 11, p. 138.]

A.D. 1852, March 8.—Nº 14,001.

UNDERHAY, Frederick George.—"Improvements in ap-" paratus for regulating the supply of water to waterclosets and " other vessels, and in taps or cocks for drawing off liquids."

The improvements in regulating the supply of water to water-closets are:—

In a water closet in which the quantity of water flowing into the basin of the water closet depends upon the time during which a supply cock remains open, a cylinder containing water is provided. The drawing up the handle raises a lever, the shorter arm of which opens the said supply cock. The descent of this lever is retarded, and therefore the shutting of the cock delayed by means of a piston working in the above-mentioned cylinder. The piston has a valve opening downwards against a spring, and when it is raised by the handle the water flows freely through the valve, "but in descending the valve will be closed, " and the water will then only be able to flow between the " piston and the cylinder, and the speed of such flow will de- " pend on the space left between the piston and the cylinder."

An apparatus is described and shown in which air is used to retard the shutting of the supply cock. A flexible bag within a wooden box has a valve at its bottom which opens inwards, and a small hole at the top part or cylindrical cover. The bag is extended, on raising the lever, without delay, as the air rushes therein principally through the valve; when the handle is released, the weight of the rod and appurtenances depresses the upper part of the bag, and the air rushes in through the small hole, the size of which regulates the time of descent.

[Printed, 1*s*. Drawings. See Repertory of Arts, vol. 20 (*enlarged series*), p. 298; London Journal (*Newton's*), vol. 42, (*conjoined series*), p. 278; and Mechanics' Magazine, vol. 57, p. 237.]

A.D. 1852, April 27.—N° 14,091.

TYLOR, Alfred, and FRASI, Henry George.—"Improve- " ments in heating and supplying water for baths and other uses, " in the construction of water closets, and supplying them with " water and in cocks for drawing off liquids."

The parts of the invention that relate to water closets are:—

1st. Supplying water to a house closet.—A water-supply vessel, on the same level as the basin, has an induction pipe covered by a valve opening inwards, and two eduction pipes, one leading to the upper part of the basin, the other leading from the lower part of the vessel through the hollow axis of the pan of the basin into the said pan. When the handle is pulled, a lever in connection therewith discharges the pan and acts upon other levers in connection with the water-supply vessel, so as to depress a ball or float therein, thereby opening the induction valve and causing the water to flow into the basin so long as the float is kept down. When the float again rises into its highest position it closes the induction valve, and as the water then stands higher in the vessel than in the basin, it will flow into the basin.

2nd. Supplying water to a ship's closet.—This part of the invention is applicable to closets placed below the water line of the ship. The chamber with the float and valve is in connection with the pump which expels the soil into the sea. When the piston of the said pump is raised, the soil and water from the basin flow into the lower part of the pump, and water in the upper part of the pump (derived from the chamber) is forced into the basin. On the descent of the piston, the valve to the basin closes and the water flows into the upper part of the pump from the chamber; the float descends, admits sea water to the chamber, then rises and cuts off the incoming water.

[Printed, 10*d*. Drawings. See Mechanics' Magazine, vol. 57, p. 392.]

A.D. 1852, August 23.—N° 14,273.

JENNINGS, Josiah George.—"Improvements in water-" closets, in traps and valves, and in pumps."

According to the improvements in water closets, the basin and trap are combined in one piece. The discharge passage is at the side of the basin, thereby enabling a certain quantity of water to be held at the bottom of the pan or basin. The discharge passage proceeds downwards to a bend which constitutes the trap and recurves upwards, touching the bottom of the basin, it then descends vertically. The water supply from the upper part of the basin washes out the bottom of the basin and furnishes water which fills up the bend, running over into the vertical part of the discharge pipe, thus forming the water seal in the bend which constitutes the trap and prevents the effluvium from the soil pipe from rising into the closet. "The basin may be formed inde-" pendent of the trap, if preferred."

The method of forming the trap which constitutes another part of the invention "consists in reversing the trap now known as " the bell trap." The cup is fixed in the centre of the outer casing of the trap with its opening upwards. A pipe, which *forms a part of* the outer casing, and tapering from the upper external orifice of the trap, dips into the water contained in the cup with its small end, and thus forms the trap. A grating is placed over the upper external orifice of the trap "which may be "fixed or otherwise."

[Printed, 1*s*. 10*d*. Drawings. See Mechanics' Magazine, vol. 58, p. 197.]

PATENT LAW AMENDMENT ACT, 1852.

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A.D. 1852, October 1.—N° 10.

ROE, Freeman.—"Improvements in valves and cocks."

1st. "Improvements of cocks where ball-valves are used."

2nd. "Arranging valves or cocks for supplying waterclosets or "other vessels with a measured quantity of water." This improvement "consists of arranging the outlet valve" [so?] "that "it will let out the water from a box when the pressure from the "incoming water is shut off."

The drawings represent a water closet basin supplied by a box which may be fixed in any situation; a tubular aperture of very small sectional area is represented at the top of the box, and at the underneath part of the said box the large supply pipe is fixed. On depressing the spindle of the valve on the supply pipe, the water enters the box, causing pressure therein, which keeps the valve leading to the pan in its place. As soon as the pressure of the hand or of the seat is removed, the valve leading to the pan floats and allows the water to escape into the basin. The supply valve represented is that which forms the 1st improvement, in which a rod slides freely through a stuffing box, so that the valve may be pushed from its seat by pressure; when the rod is no longer pressed, the pressure of the water on the valve forces it into its seat.

3rd. Improvements in sluice-cocks or hydrants.

[Printed, 6*d*. Drawing.]

A.D. 1852, October 5.—N° 243.

GETLEY, Samuel,—"Improvements in waterclosets."

According to this invention, a water closet is so constructed that it may be used direct from the main without any connection with a cistern. A rod is attached to the seat, which, by the weight of a person sitting thereon, actuates the several parts of the apparatus. When the pressure is removed from the seat, the soil is discharged from the pan, and the water to cleanse it is admitted thereto.

One apparatus consists of a system of five levers, in connection with a plunger and valve arrangement on the one hand, and with counterbalance weights and catches on the other hand; the plunger and valves admit the water to the pan, the counterbalance weights and catches release the part of the pan containing the soil and water, and thereby discharge the soil from the pan. A small passage connecting the supply pipe with the underneath part of the piston or plunger, and a cock in connection with this passage enables the quantity of water admitted to the pan to be regulated.

In another apparatus, the pan has a branch at the side to receive a valve by the elevation of which the soil is discharged from the pan. The piston and valve arrangement is a modification of that set forth above, and is worked as in the apparatus already described. The system of levers employed consists of three instead of five. There is a separate regulating cylinder to this arrangement.

[Printed, 8*d*. Drawings.]

A.D. 1852, October 12.—N° 346.

PERKES, Samuel.—"Certain improvements in mines, buildings, " and sewerage, for effecting sanitory purposes, and treating the " produce therefrom."

The following parts of this Specification more especially relate to the present series of abridgments. In constructing urinals and water closets, " I propose to construct an upright reception pan " with a double rim or case, so as to form a channel of water " entirely around it, and into which the water will flow in a " gentle stream, either intermittently or continuously as may be " required." It is also proposed to make urinal and water closet pans of glass. " A portable commode pan, either in con-

" nection with the above, or to be used separately," may be constructed of glass and furnished "with a suitable lid, either " attached with hinges or catches, and provided with a ring of " india-rubber all around, or other suitable substance, so as to " prevent the escape of the effluvia as far as possible before " removal." An arrangement of apparatus for "forming a more " perfect system of sewerage, and treating the produce therefrom " is also described.

[Printed, 8*d*. No Drawings.]

A.D. 1852, October 13.—N° 371.

McFARLANE, Walter.—" Improvements in water closets.'

In addition to the general arrangements, the following are the points of this invention which are claimed as novel :—1st. "The " application and use of an inclined trough or receiver for receiving and collecting deposited matters in waterclosets." 2nd. " The system or mode of discharging the receiving troughs or " chambers of waterclosets by means of bell traps." 3rd. "The " system or mode of working waterclosets, wherein the " solid matters are periodically discharged by the attendant while " the fluid matters " [admit ?] " of a constant self-acting flow." 4th. "The application of a division piece in the soil trough for " separating the solid matter of deposit from the discharge " valve apparatus." 5th. "The arrangement of waterclosets " with spitting recesses, in communication with the discharge " passages of the deposited matters." 6th. "The system or " mode of ventilating waterclosets by forming the same with " clear open tops above the seats, in connection with perforated " upper sides for the passage through of air." 7th. "The " arrangement and construction of waterclosets with separate " receiving chambers for discharging utensils." 8th. "The " system or mode of constructing vase waterclosets of cast iron " either in one piece or with the bottom trap discharge pipe " separate, and with the basin lined with porcelain." 9th. "The " system or mode of supplying water to watercloset basins by " means of a perforated annular pipe to lead the fluid all round."

[Printed, 1*s*. Drawings.]

A.D. 1852, October 20.—N° 454.

CLARKE, Charles, and GILBERT, John.—" Improvements " in the supply and distribution of water and other fluids."

"The invention consists of the application of two self-acting
" valves (a lower and upper valve), connected by a pipe for con-
" veying water by a main pipe or elevated reservoir to a cistern
" placed within range of the supply from the main, and by means
" of the same pipe to draw water from the cistern." "The
" lower valve is to be placed inside of a casing or cock," "and
" put in any convenient part of the pipe, so that the water may
" flow from the main, and by its pressure, open the valve and
" pass along the pipe, communicating therewith to another valve"
" to be placed as near as possible at the bottom of the cistern."

" The opening and closing of the upper valve is effected by
" means of a float made to rise and fall on a rod as the water in
" the cistern rises or falls."

"We make no claim for the valve or valves separately, but only
" when two or more valves are used in connexion and made self-
" acting, and protected by strainers to prevent any extraneous
" matter getting to the valves."

"We also claim an apparatus for opening and closing a valve
" or cock for the supply of water-closets, consisting of a lever
" and eccentric keyed on to the shaft, which opens the pan or
" valve of the watercloset."

The valves and other apparatus in connection with this invention form a complete whole, when used in connection with the supply of water to a water closet, bath, or sink. The drawings show the entire arrangement applied, as described, to a water closet, to a wash stand in an upper floor, and to a sink in the kitchen of a dwelling house.

[Printed, 8*d*. Drawing.]

A.D. 1852, November 19.—N° 781.

HUME, JAMES.—" Improvements in water-closets."

This invention relates to the class of water closets in which the soil and water are removed from the basin by means of a pump. A double-acting pump is connected with the bottom of the basin. There are two valves in the valve chest, one opening into the barrel or cylinder of the pump below the piston and the other into a branch pipe. The pump has a branched outlet pipe wherein are two valves opening outwards, one being that through which the contents of the upper part of the pump are discharged, and the other that through which the contents of the lower part of the pump barrel are discharged into the sea or elsewhere. Water is supplied to the basin by a pipe in which a tap with index hand and dial are fixed. "After using this water-closet the contents " of the basin are pumped out, and water is then allowed to flow " into the basin."

[Printed, 8*d*. Drawings.]

A.D. 1852, December 20.—N° 1112.

FONTAINEMOREAU, PETER ARMAND LE COMTE DE.—(*A communication.*)—(*Provisional protection only*)—"An im- " proved mode of constructing night stools and utensils, water " closets, urinaries, and other recipients of fecal matters; also " applicable to apparatus for containing fluids liable to or in a " state of decomposition."

"This invention consists in interrupting the circulation between " the gases contained in recipients of urine and other decom- " posing fluids and the external air."

The upper part of night utensils is closed with a lid or cover of a deep hollow form, made to fit closely upon the ridges by means of a band of any soft or elastic material, such as leather or gutta percha; the centre part of the cover is a pierced prolongation dipping into a cup or basin adapted to the bottom of the cover, being a little below the prolongation.

The urine or other fluid to be introduced into the vessel or recipient, in passing through the orifice, leaves a certain quantity in the cup, sufficient to cover the bottom part of the prolongation, and shut the interior of the recipient air-tight. "The isolation " of the fluids being effected, is interrupted only by the fall of " fresh fluids, which by their weight re-establish a current of air, " which is again interrupted, after the falling has ceased, by a " fresh interposition of fluid in the cup. It will be understood " that the above contrivance may be applied to urinaries, water- " closets, and other receptacles where infectious gases are " aggregated."

[Printed, 6*d*. Drawing.]

1853.

A.D. 1853, January 8.—N° 54.

SMITH, THOMAS.—(*Provisional protection only.*)—"Certain "improvements in soil pans."

"This improvement consists in forming a 'fan' or 'spreader' "of earthenware which shall be firmly affixed by the adhering of "the clay itself before baking at its upper portion, but having "no studs or blocks of support elsewhere, so that the flush of "water may not be impeded in its escape into the pan, and thus "flush or cleanse it at every part."

The drawings represent, in section and elevation, that portion of the pan or basin which includes the spreader. Although projecting downwards very much below the orifice of the supply pipe, with a very thin slit between its bottom edge and the side of the pan, the spreader is only joined to the pan by its top edge. The top edge of the spreader is of the same configuration as the upper part of the pan, which is thickened to afford a secure attachment to the pan.

In manufacturing the pan with this spreader, when the pan is moulded, a piece of paper, cut so as to cover the requisite space, is placed over its inlet hole, and a piece of clay, moulded to the shape of the spreader is placed over this, "so that its upper "portion being above and overlapping the paper will unite or "adhere to the clay of the pan." The thickness of the paper determines the distance of the spreader from the pan. When "the pan is placed in the kiln for baking, and has arrived at a "red heat, the paper will be consumed and leave a space equal "to its own thickness, the clay having by that time become firm "and immoveable."

[Printed, 6*d*. Drawing.]

A.D. 1853, February 2.—N° 286.

WILLIAMS, OWEN.—"Improvements in water closets."

"This invention consists in combining fire or heat with a water "closet in such manner that the soil may be burned or dryed up "in place of going away with any water used in the closet, as "heretofore."

The pipe containing the drying apparatus descends from the water closet, and has in it a valve, the axis of which passes across the pipe. This valve "is arranged and worked in such "manner as to be caused to make a half revolution on its axis "after the closet has been used." Above this central axis valve is another valve that is ordinarily kept shut; the latter is a flap valve worked from an axis at the side by the weight of the person on the seat.

Underneath the lower valve is a shoot leading to a soil pan that is heated by a gas burner. A suitable chimney carries off the effluvium. The gas may be turned low or put out (in the latter case, a small supplementary jet near the burner being kept constantly lighted) when the closet is being used. Above the burner and surrounding the shoot under the valve is a boiler that receives the urine and water, the lower valve being inclined to allow of the fluids flowing into this boiler. Steam arising from the boiler is conveyed by a pipe into the chimney.

When the closet is used, the upper valve is opened by means of a vertical rod and arm; chain wheels and an endless chain communicate motion from the upper to the lower valve. The surface of the lower valve, which is upwards when the closet is being used, is downwards when it is out of use. The soil, and urine, or water fall on to the surface of the lower valve, and the fluids at once flow into the boiler. When the upper valve is closed, the lower valve revolves half round and the soil descends into the pan, there to be dried up and burned.

[Printed, 8*d*. Drawing.]

A.D. 1853, February 3.—N° 299.

TYLOR, ALFRED, and FRASI, HENRY GEORGE.—"Improve"ments in water closets."

This invention "consists in the mode of supplying water closets "with water, and in the means employed in communicating "motion to levers and valves for working the same."

In one method, which is shown in connection with a pan closet, the pull up is attached to the lever of the water valve. A roller is fixed on the body of the closet, and the locking lever has a disconnecting piece jointed on to it. The valve lever is made to work the locking lever by means of a slot in the disconnecting piece. When the pull up is raised, the water valve is opened and the locking lever is raised by means of the slot and pin, until the roller acts upon the tail of the disconnecting piece and releases the pan, which discharges its contents and returns so as to be partially closed. The locking lever, in its progress down, comes into contact with the pin, in which position it is held until the pull up is depressed, the water valve being in the meantime full open. By this arrangement, the pan can never be short of water. Counter-balance weights bring the levers down after being raised.

The second improvement relates to "causing a pull up rod to "pass through a stuffing box to actuate or communicate motion "to the valve." The pull up rod is jointed to a tumbler piece, which works on a centre at one end and in a slotted piece connected with the pan valve at the other end. The valve seat is of india-rubber. When the pull up rod is raised, the tumbler piece is raised in the slotted piece, and the pan valve is made to discharge its contents.

[Printed, 6*d*. Drawing.]

A.D. 1853, February 21.—N° 445.

BELL, Thomas, and CHRIMES, Richard.—"Certain im-"provements in valves applicable to the receiving and discharging "of water or other fluids."

1st. "A combination of two valves in one, for the purpose of "receiving and discharging water or other fluids in such manner "that the quantity of water or other liquids discharged at one "operation of the valves shall not exceed a fixed measure; it is "more particularly intended to be applied to water-closets for the "purpose of preventing waste of water."

The drawings show this combined valve attached to a service box, fitted within the main or supply cistern; the capacity of the service box "fixes the limit of one full discharge." A cylindrical case has a portion of its sides cut away; its lower part or base forms the seat of the discharge valve and the facing of the inlet valve is formed in the cylinder cover. The two valves are cast in one piece, connected by the spindle common to them both; the discharge valve has "three radiating mid-feathers (as usual) to "keep it central when moved up or down;" the inlet valve is a hollow cylinder which is fitted into the cylinder cover and is provided with apertures, so that when the discharge valve is on its seating, one series of apertures will be outside and the other inside the cylinder cover, forming a communication between the inside of the service box and the supply cistern, and, when the inlet valve is against its facing, both series of apertures are outside the service box. The lower part of the case is fitted with a hollow screw nut to attach the discharge pipe, and a cap with an eyelet hole is screwed on to the upper part of the inlet valve. This valve is worked in the usual way from the water closet handle, by means of rods or wires and a weighted lever. By the addition of a T-piece and upper valve spindle, this arrangement may be used to discharge water direct from the main.

2nd. "Self-acting sluice valves for drawing or discharging "water from mains of 'water works.'"

[Printed, 6*d*. Drawing.]

A.D. 1853, March 23.—N° 706.

PARK, John Henry, and PARK, Joseph.—"Improvements "in water closets and urinals."

This invention relates to the valvular apparatus of water closets. It consists "of a cylinder, which forms the body of the "valve, and" "is fitted with two conical faced or lift valves fast "on a spindle working through a stuffing box and an internal "guide. The water supply pipe for the ordinary working of the "closet opens into the cylinder near its upper end, and the pipe "supplying the basin opens into the cylinder near its lower extremity. A third pipe opening from the centre of the valve "cylinder forms a communication with an air vessel or reservoir "for containing as much water as is required to run down the "closet at one time. "The pipe from the air reservoir, as well "as the pipe leading to the basin, is of much larger area than the "supply pipe. The conical seated or lift valves are so arranged "in the cylinder that when the water closet seat is depressed the "communication is established between the supply pipe and the "air reservoir, whilst the inlet communication to the basin is "closed. This allows the water to flow into the air reservoir "until it is nearly filled. When the seat rises, however, the "valves drop, and a communication is effected between the reservoir and the basin, whilst the water from the supply pipe is "shut. The reservoir and basin pipes being of larger dimensions "than the other pipe, the water forced out of the air vessel more "effectually flushes the basin than when a thin stream only is

" introduced. The basin is preferred to be of the S section, as " with this shape the water, by its rotary motion, will remain ' longer in the basin, and will consequently clean it better." The receiver or air vessel, employed to utilize air pressure to thoroughly flush the basin, is perfectly air-tight and is of such a form that its lower part is considerably larger in sectional area than its upper part. When the valve spindle is down, whilst the water closet is out of use, the superincumbent pressure of water from the service pipe is upon the back of the upper valve, and the tight closing of this valve is thus satisfactorily ensured.

[Printed, 6*d*. Drawing.]

A.D. 1853, April 14.—N° 904.

ADAMSON, Joseph.—" Improvements in flushing apparatus, " and in water closets."

1st. " A peculiar construction of cistern for effecting the flushing of water-closets, sewers, urinals, &c."—The body of the flushing cistern is fitted, at one extremity, with a fixed syphon made the entire width of the cistern, and contracted slightly at its lower discharge orifice, which opens into a funnel mouth on the top of a vertical pipe which communicates with the basin. The cistern is suspended upon fixed pivots which are placed slightly out of the centre of the cistern, this eccentricity being counterbalanced, to a certain extent, by a weight fitted to the opposite end of the cistern. When the cistern is nearly full, the weight of the water on the larger overhanging surface will overbalance the weighted end of the cistern, and cause it to turn on its centre, thereby charging the syphon which draws off the water from the cistern, and flushes the basin. The flow will continue until the weight of the water at one end of the cistern becomes so reduced as to be overbalanced by the weight at the other end of the cistern, which then assumes its original position. By this means, the discharge may be made into the pan or basin, sewer or urinal periodically.

2nd. Constructing water closet basins.—The basins constructed according to this improvement are mounted upon fixed pivots, as in the cistern described in the first improvement. They may or may not have a syphon at one end. Water continually runs into this basin, and it is periodically discharged. By the first arrangement, a flushing cistern as well as a basin is required. In this arrangement, a flushing basin alone is required, the cistern and basin being combined in one.

[Printed, 6*d*. Drawing.]

A.D. 1853, July 14.—N° 1675.

HUMPHERY, George.—" Improvements in regulating the " supply of water for water closets."

In one apparatus described and shown, the service box is furnished with two pipes, an inlet pipe and an outlet pipe; these pipes enter the bottom of the box. The inlet pipe may be supplied either from the main direct or from a cistern. The outlet pipe conveys the water direct to the basin. Each pipe has a valve in the service box. The service box also contains a horizontal spindle which works in a boss cast on the side of the box, passes through a stuffing box, and carries, on its outer end, a lever, to which is attached the rod and handle for actuating the valves; the spindle is therefore capable of oscillation. A lever and connecting rod connect the spindle with the outlet valve, and on the inlet valve is keyed a toothed quadrant which gears into a quadrant keyed to the horizontal spindle; the motion of the spindle therefore actuates both valves. When the handle is raised, the induction passage is shut and the outlet valve discharges the water into the basin; when the handle regains its position, the inlet valve is opened and the box is refilled. A float valve, at the top of the box, admits the air or allows it to escape.

In another arrangement, the quadrants are dispensed with, the valves being connected by a rod and acting in such manner that when the eduction valve is opened, the induction valve closes. The induction and eduction valves are attached to the same vertical rod which works through a stuffing box and is attached to the lever which is actuated by the handle. When the lever is released, a helical spring presses upon a nut that is screwed upon the rod and causes the eduction valve to close, at the same time opening the induction passage.

[Printed, 10*d*. Drawings.]

A.D. 1853, July 23.—N° 1738.

WARNER, Frederic, and LEE, John.—(*Letters Patent void for want of Final Specification.*)—" Improvements in water closets " and urinals."

"This invention consists of employing an inverted vessel open "at its lower end to govern the time at which the supply of "water to the basin of a water closet shall be stopped after the "handle is released. The inverted vessel has at its upper end a "small hole for the passage of air, and according to the size of "such hole and the quantity of the contained air so will be the "time occupied in shutting off the supply of water. The inverted "vessel is placed in another vessel containing water or other "fluid, from the bottom of which rises a central pipe with a valve "at its upper end; hence, when the inverted vessel is raised, the "air will pass freely through the large passage of the rising pipe "into the inverted vessel; but on the handle being released the "valve on the rising pipe will close, and there will be no escape "for the air out of the inverted vessel, except through the small "hole of the upper part; or, in place of the valve being placed "on a rising pipe, the large passage may be in the inverted vessel "having a valve opening inwards."

[Printed, *4d.* No Drawings.]

A.D. 1853, October 7.—Nº 2299.

LAMBERT, THOMAS. — "Improvements in ships' water "closets."

The object of this invention is to prevent the splashing of water over the basin which may be caused by the rolling of a ship. The basin is made in two parts:—"The upper part, and that "which comes near the seat, is conical or hopper formed, and the "under basin, with its valve or pan, may be of any of the ordinary forms, with suitable apparatus for moving the valve or "pan and for supplying water, which supply of water is caused "to pass into the upper hopper or cone-shaped part of the basin. "By this arrangement, when, by reason of movement of the "ship the water in the lower basin is caused to move or splash, "it will, in place of being thrown or splashed on to the seat, "simply come between the upper and under parts of the basin."

[Printed, *6d.* Drawing.]

A.D. 1853, October 31.—Nº 2513.

GRAY, JOHN.—"A self-acting flushing apparatus, applicable to "sanitory purposes."

The object of this invention is to scour out water closets, *privies*, &c., by flushing them periodically.

The apparatus comprised in one arrangement consists of a float chamber attached to the cistern and containing an interior chamber with valves. The float chamber contains a syphon which communicates with a counterbalanced bucket. The counterbalance weight can raise the bucket when empty, and is connected with the valve which discharges the contents of the cistern. On water being supplied by the supply pipe from the main, it passes into the valve chamber, and, both the valves that lead into the float chamber being closed, the water has no other outlet but into the cistern. When the water in the cistern attains such a level that it can enter the float chamber and raise the float to which the valves are attached, thus opening the valves, a communication is formed between the supply pipe and the float chamber. The water thus rapidly accumulating in the float chamber will pass through the syphon into the bucket, by which means the counterbalance weight is raised and the discharge valve suddenly opened. The syphon having emptied the float chamber, the parts resume their original positions, and the above-described action is repeated.

Another arrangement is described and shown, in which a chamber with only one weighted valve is used, and the pipe communicating between the cistern and the float chamber is placed high up in the said float chamber. The valve is seated on a neck in the top of the valve chamber, which has a bottom pipe with an end opening into the cistern. When the water has entered the cistern through the valve chamber and filled it to the height of the communicating pipe, the water enters the float chamber rapidly and fills the bucket, as in the first arrangement.

[Printed, 8d. Drawing.]

A.D. 1853, November 4.—N° 2565.

HIGGINBOTTOM, John Hartley.—(*Provisional protection only.*)—"Improvements in water closets and in the apparatus "connected therewith."

A service pipe is fitted with two valves, which are acted upon simultaneously when the seat of the closet descends. One of them is opened and allows a certain quantity of water to flow into the service box; the other is closed, and remains closed till pressure being removed from the seat it rises, and then the water in the service box enters and flushes the basin.

[Printed, 4d. No Drawings.]

A.D. 1853, November 18.—N° 2674.

GUY, Alfred.—(*Provisional protection only.*)—"A portable "water closet with water supply without the action of pump."

"A cistern or outer case is constructed, lined with metal, to "contain a certain quantity of water. Into this cistern is fitted "a moveable inner cistern or pail of a lesser size, allowing room "for the water contained in the outer cistern to remain a certain "depth at the bottom; a space is left between the sides of the "inner and outer cisterns. The inner cistern is constructed to "receive a closet pan made of metal, lined with glass, and having "a trap valve by means of a weight attached at the bottom, and "so constructed as to retain a small quantity of water to prevent "smell arising from soil passed through the valve. The top of "this closet pan is constructed to fit into a groove in the innermost cistern, the edge of which rests in water contained in the "grove also to prevent smell. Over these cisterns is fitted a "moveable seat as in the ordinary water closet; a lever is fixed "through the outer case, having a handle attached: by pressing "this handle round either way the lever acts on the edge of the "inner cistern or pail and forces it down; this pressure acts on "the water contained in the outer cistern, and causes it to rise "up the aperture or space left between the sides of the inner "and outer cisterns, and thence flows over the top of the inner "cistern all round its edge, through the pan and valve, and "into the inner cistern. This is repeated, when necessary, until "all the water in the outer cistern is exhausted and is received "in the inner; the inner cistern or pail thus contains all soil "and water, and is taken out and emptied when considered necessary."

[Printed, 4*d*. No Drawings.]

A.D. 1853, November 18.—N° 2681.

CLAVIÈRES, Jean Baptiste.—"An improved mode of giving "publicity."

This invention "consists in constructing advertizing urinary "columns, to be set on the sides of streets, roads, and public "places.

"*The accompanying drawing shews the arrangement of the* "*said column, which* may be of a square, round, or angular shape.

" The lower part is suitably disposed as a urinal, or may be em-
" ployed as stalls or for other useful purposes; the upper part
" consists of a strong framing divided into the required number
" of compartments, which are covered with a transparent material,
" such as glass or waterproof tissue, on which the advertizements
" or placards may either be painted or made to adhere. The
" transparent sides and interior of the urinary chambers are
" illuminated at night by the suitable adjustment of a gas or
" other light in the upper part of the column."

[Printed, 8*d*. Drawings.]

1854.

A.D. 1854, January 21.—N° 147.

WATSON, Henry.—" Improvements in water closets."

"The object of this invention is to simplify the arrangement of
" apparatus for moving the pans or valves of water closets, and
" for supplying water thereto, and consists of combining the axis
" of the pan or valve of a water closet with the plug or valve of
" the water supply pipe, and using a box at the end of the supply
" pipe."

The drawings show a pan water closet, in which the axis on which the pan moves is attached to the conical plug of the ordinary tap or cock on the water supply pipe from the main, so as to act as the key to the cock. From the tap the supply pipe goes to a service box or small reservoir on the same level as the spreader and immediately in contact with it. The handle actuates a weighted arm fixed to the axis of the pan. When the handle is raised, the cock is opened at the same time that the pan is emptied. On the handle being shut down, the pan is returned into its place, and the water left in the service box fills up the pan after the supply from the supply pipe is cut off by means of the cock.

The above-described combination of apparatus may be applied to a valve closet. In both cases the axis " is to be conducted
" through and move in stuffing boxes in the sides of the trunk
" or outer vessel."

[Printed, 6*d*. Drawing.]

A.D. 1854, January 24.—N° 175.

WILLIAMS, George.—(*Letters Patent void for want of Final Specification.*)—" Improvements in the construction of water-" closets."

This invention " is called an improved self-acting water-closet, " and consists in the application to the ordinary water-closet of a " lever acted on by the feet to supply the place of the usual " handle, which is liable to get out of order when frequently " used. This tread lever is connected with a valve to a basin, " and with a supply valve for water for the basin." This invention " also consists in the use of a clearing valve for removing " from the receiver any lodgment that may be made therein, and " of an after supply pipe to convey water into the basin when the " supply valve is closed."

The drawing represents a water closet complete, with the above-mentioned improvements. The supply valve is connected to a cistern by a service pipe, and to the spreader in the basin by another pipe which also supplies water to the basin after the supply valve is closed. A connecting rod, jointed to the tread lever, works the supply valve. The pan valve is actuated by means of a tumbler, axle, and slotted lever, in connection with the extreme end of the tread lever. The clearing valve is shown on the side of the receiver.

Although these improvements are applicable to water closets for houses, they are more especially adapted to ships, and particularly to emigrant vessels.

[Printed, 6*d*. Drawing.]

A.D. 1854, February 28.—N° 486.

PATTEN, William.—" Improvements in valves and apparatus " for supplying water."

These improvements relate to arranging valves so that they may supply regulated quantities of water to water closets and other apparatus. " A valve box is arranged with two valves, an inlet " valve and an outlet valve; the stem of the inlet valve is con-" nected with a weighted lever, and is moved by a handle, or it " may be by the seat of a water closet or otherwise. The inlet " valve opens against the flow of water into the valve box, and " the water flowing into the valve box flows to a small cistern or " receiver in connection therewith; the quantity of water so "allowed to flow through the valve box is, when the inlet valve "is closed, allowed to flow into a water closet or other basin "by a projection on the stem of the inlet valve coming against "one end of the lever on which the outlet valve is mounted, "and opening it, but which outlet valve will again be closed on "the stem of the inlet valve moving to open the inlet valve."

[Printed, 6*d.* Drawing.]

A.D. 1854, May 1.—N° 974.

MACFARLANE, WALTER.—"Improvements in water closets, "lavatories, dust bins, and public and domestic conveniences."

These improvements relate to, 1st, "the general arrangement "and construction of water closets, lavatories, dust bins, and "public and domestic conveniences;" 2nd, "constructing the "seats of public and domestic water closets of cast iron, with a "surface covering of wood, and with an oblong opening extending to the back;" 3rd, "the application and use in water closets "of a self-shifting tablet, to indicate externally when the closet "is occupied;" 4th, "the system or mode of connecting the "gearing of two or more water closets or other conveniences, for "the purpose of simultaneously discharging the same, by means "of a lever which can be worked outside or at a distance from the "conveniences themselves;" 5th, "the system or mode of causing "one set of water supply gearing to act for two or more distinct "water closets;" 6th, "the system or mode of trapping the discharged ducts of urinals, and providing a hinged grating for "clearing out matters casually deposited in the trap details;" 7th, "the application and use of cast-iron dust bins, with separate receiving and discharge doors;" 8th, the application to water troughs and lavatories of supply and discharge apparatus of apparatus applied to water closets, and which is described in No. 371 of the year 1852; and 9th, "the application and use of a "drinking mouth-piece."

The drawings show the said conveniences arranged together in a single building, octagonal in plan.

[Printed, 1*s.* Drawings.]

A.D. 1854, May 6.—N° 1017.

JENNINGS, JOSIAH GEORGE.—"Improvements in apparatus "for regulating and supplying water for water closets and other "purposes."

The improved apparatus consists of "a cistern which is sup-" plied from a water main or other source, and the supply" regulated by a ball-cock or float." "From this cistern the" longer leg of a syphon descends to a water closet or otherwise," the shorter leg of the syphon being in the cistern, and the bend" of the syphon comes just above the ordinary level of the water" in the cistern. In order to cause water to descend from the" cistern, the level of the water is raised, and this, by preference," is done by introducing a plunger into the water which raises the" water level, so that it comes above the bend of the syphon, when" the syphon will immediately come into action, and the water in" the cistern run off."

Another plan of raising the water level, shown in the drawings, is to lower the bend of the syphon. In this case the plunger is dispensed with, a sliding cap forming the shorter leg of the syphon. The plunger or cap (as the case may be) is attached to the extremity of a lever worked by the pull of the water closet.

[Printed, 10*d*. Drawing.]

A.D. 1854, May 6.—N° 1023.

HIGGINBOTTOM, JOHN HARTLEY.—"Improvements in the" valves and apparatus connected with water closets, certain por-" tions of which are applicable as cocks or valves for other" purposes."

The first part of this invention relates to water closet and other valves, and "consists of an improved form of sluice-valve with" ground metal faces, the diaphragm being kept pressed against" the face of the valve by the pressure of the water; it is attached" loosely to the actuating spindle, which passes through a stuffing" box on the shell of the valve or cylinder, the actuating spindle" having a cup of leather thereon, which causes it to be self-" opening."

The second part relates to a self-acting ball-valve applicable to the service boxes of water closets, to prevent them from overflowing. "It consists of a hollow ball attached to a vertical tubular" spindle, which works through a nut in the top of the service" box; a slot or lateral opening is made near the bottom of the" spindle, in order to allow the air to escape from the service box;" an aperture is formed in the ball to admit air therein, and equalise" the pressure outside and inside, and so prevent it from burst-" ing in frosty weather."

The third part relates to an improved pan, which is "composed " of earthenware, and is formed with a syphon trap; the flushing " water is admitted all round the top of the pan, a lip being formed " thereon for that purpose, such lip being turned inside to form a " a species of tube or water duct, open at the under side; by this " means the water is more effectually distributed over the surface " of the pan."

In the water closet shown in the drawings, the closing of the valve which allows the water to flow into the pan from the service box, simultaneously opens the cock which admits the water from the main to the service box. A weighted lever may be used to thus actuate the said valves.

[Printed, 10*d*. Drawing.]

A.D. 1854, May 16.—N° 1091.

MANWARING, George, and SUMMERS, William Alltoft.—"Improvements in supplying water for water closets, " for the flushing of drains, and for general purposes."

The following is one of the methods of putting this invention in practice:—"Water is admitted into a closed reservoir through " a two-way cock; at the top or upper part of the reservoir is " an air valve, which is closed by a float inside the reservoir, and " which shuts the air aperture when the water rises to a given " height in the reservoir. The reservoir being full, and the contents being required to be drawn off or let out, the plug of the " two-way cock is turned, whereby communication with the main " will be closed, and a communication established between the " reservoir and the pipe leading to the pan of a water closet, or " to other source from whence water is to be taken. In the case " of water closets, we find it better to provide a large way for " the water to run from the reservoir, while the pipe leading into " it from the main need be but of small diameter. The object " of the large outlet from the reservoir is for the liberating of a " large body of water, for the purpose of thoroughly cleansing " the pan, or for the effectual flushing of sewers, &c."

[Printed, 8*d*. Drawing.]

A.D. 1854, June 24.—N° 1400.

KENWORTHY, John, and RIGBY, Thomas.—(*Provisional protection only.*)—"Improvements in water-closets."

These improvements are said to be :—

"First, in the retention of the pressure of water at the fan of "the basin at the same height as that of the water contained in "the air chamber, by means of the removal of all slides or "obstructions that have hitherto been used between the air "chamber and the pan or basin, whereby a better and more "perfect washing or rinsing of the pan is ensured."

"Secondly, in the disuse of stuffing boxes, whereby leakage is "prevented as well as simplicity of construction ensured, and the "probability of the stiffening by inaction or other causes entirely "avoided."

"Our improvements may be worked or put in action by either "pressure from the seat, or by any other convenient method."

[Printed, 4*d*. No Drawings.]

A.D. 1854, July 11.—N° 1518.

MOORE, Charles Fredrick.—(*Provisional protection only.*) —"Improvements in the construction and use of an apparatus, "closet, or receptacle to be used instead of a watercloset or "other necessary, and which may be either fixed or portable."

A square or other shaped box is fitted with an air-tight lid, "a "board or step being pressed by the foot or other part of the "person coming into contact with the box;" or the foot may act on a lever or lever and spring, which will open an air-tight trap or valve. At the same time the lever or spring, "connected if "necessary with either a valve, double valves, slides, or springs," distributes from a reservoir a disinfecting powder or fluid, which will deodorise and dry the fecal matter on its falling into a pan; further also, on the person rising from the seat, "removal of con- "tact or pressure, or by lever spring or both, another discharge "or shower of disinfecting substance takes place." The fecal matter is to pass into a receptacle separated from the urine, although any fluid therefrom may drain into the urine receiver by means of a perforated partition of the pan "with a flange "attached near the anterior part." The receiver has "a dis- "charge or overflow pipe, with a self-acting valve, which may be "detached when required;" it may be attached to and removed with the fecal receptacle, or one or either may be removed separately; "or one or both may be separately or jointly lowered to "any convenient place to be emptied." A ventilating pipe, with

" a valve to prevent the influx of atmospheric air into the closet, " may communicate with the interior of the apparatus."

[Printed, 4d. No Drawings.]

A.D. 1854, August 29.—N° 1888.

GRAY, JOHN.—" A self-acting flushing apparatus, which may " be arranged for registering the quantity of water or other liquid " flowing through it."

The first part of this invention relates to the cleansing and scouring of cisterns, sewer pipes, and other receptacles at fixed intervals, " such cistern in certain cases being suitable or capable " of being used as a self-cleansing privy or description of water- " closet." The apparatus for effecting this consists of the following principal parts in combination :—" An outer chamber or " reservoir, and inner float chamber, a buoyant float," " a valve " of peculiar construction for closing the aperture or opening in " the cistern; another valve or valves, apertures, pipes, or open- " ings for the admission and discharge of liquid, an arm or rod " for connecting the float with the valve or valves and guide " rods." "The water or liquid which is constantly admitted " into the cistern flows through any suitable pipe or aperture " into the outer cylindrical reservoir, or its substitute, and rises " therein till it arrives at a lip, open pipe, or other aperture, " through which it flows into the inner cylinder or float chamber, " causing the float to rise slowly, and with it the arm, extending " to the valve rod in the cylindrical reservoir, or its substitute, " and thereby opening this valve. The opening of this valve " admits a rapid flow of water into the float chamber, and causes " the float to rise with rapidity, carrying with it the valve of the " cistern, which is connected to the float or its arm, and thus " causes the contents of the cistern to flow off with a rapid " flush."

" And my invention consists, in the second place, in an arrange- " ment for registering the number of times a given quantity of " water or liquid has been discharged through the above- " mentioned apparatus. This object is effected by means of a " lever or rod connected with a movement similar or analogous to " that known to horologists as the escapement, and which is " caused to register on a suitable dial the number of discharges, " the thoer end of the lever being raised by the float each time "it rises; the end of the lever thus acted on is caused to "descend with the descent of the float by means of a weight "attached to it or other suitable contrivance. When the first-"mentioned arrangement is united with that for registering the "discharge, the combined apparatus can be applied to other "purposes besides flushing or scouring out receptacles of "refuse, &c."

[Printed, 10*d.* Drawing.]

A.D. 1854, September 4.—N° 1929.

WHITE, JOHN LOCKHART, HENDERSON, HENRY, and COUPER, JAMES.—"Improvements in water-closets."

These improvements relate to making water closets, pans, basins, and valves of glass. "The kind of glass which we prefer for the "pans or basins, is that known by the name of 'opal.'" "After "the pans or basins have been formed to the requisite shape, "they are placed in an oven or kiln, and are afterwards cut or "drilled, as may be required." "For the valve at the lower "part of the pan or basin we prefer making it somewhat in the "form of a convex glass lens, and fitting it to its position or "seat by grinding, so as to make a water-tight joint, or a piece "of vulcanized india-rubber or gutta percha may be adapted and "applied to such position or seat, for the glass valve to fit "against."

[Printed, 6*d.* Drawing.]

A.D. 1854, September 20.—N° 2024.

TYLOR, ALFRED, and FRASI, HENRY GEORGE.—"Improve-"ments in water-closets."

1st. A mode "of constructing valves in connexion with a closed "vessel, for regulating the supply of water to closets." The valves, one for the entrance of the water to the said closed vessel, the other for its exit therefrom to the pan, are placed in a valve box, from which a pipe descends to the bottom of the closed vessel. When the pull of the water closet is at rest, the closed vessel becomes charged by the supply valve, which is then open. There being no outlet for the water but by returning up the descending pipe, the air becomes compressed, and discharges the water at a pressure proportioned to the height of the column of water to which the supply pipe is connected, when the pull is raised. The pull actuates a weighted lever, which works through a stuffing box, and, by means of an internal arm, opens the outlet valve when the pull is raised, and the weight on the lever temporarily overcome. The inlet valve is not in metallic connection with the outlet valve, but its stem is allowed to move, so that the pressure of the column of water, assisted by a helical spring, can close it, when the pressure of the outlet valve against its stem is removed by the opening of the said outlet valve.

2nd. A mode of constructing water closets in which the container and trap are made of one piece of earthenware, having the pan or valve working in the said trap, thereby making them double sealed or trapped above the floor of the closet. Some of the arrangements for working the valve levers are those specified in No. 299 of the year 1853.

[Printed, 8*d*. Drawing.]

1855.

A.D. 1855, May 4.—No. 994.

FLETCHER, Fielding.—" Improvements in water-closets."

According to this invention, the movable pan at the bottom of the basin is dispensed with. The basin rests upon a cast-iron pan, which is connected by vertical flanges to a valve box, to the bottom of which the soil pipe is attached. The valve is at the side of the pan, and is vertical when closed; it is worked by means of an axis, cranked on the inside of the valve box, and extending to the outside of the same, where it carries a weighted lever that is worked by the water closet handle. The raising of the handle opens the valve, otherwise it is kept well closed by the weight at the end of the lever. A syphon extends from the bottom of the pan to the top of the valve box, and thus enables the flushing water of the pan to escape without permitting effluvium to rise, "the " syphon being constantly wholly or partially charged with " water." The valve may be regulated by a helical or other suitable spring instead of a weight. In one instance, the drawings show a basin extending down and into a cast-iron socket or pan, into which it is secured by cement. The socket has vertical flanges for bolting to the valve box.

This invention also consists in a method of regulating the supply of water to water closets by means of a lever and float. A small cistern is placed by the side of the basin, and it has an exit pipe (connected to the pan) attached to its bottom, and an overflow pipe (connected to the valve box) attached to its upper part. In this cistern a float is free to move according to the height of the water, and, the float being attached to a lever that presses the stem of the supply valve when the float is sufficiently raised, the supply is cut off when the basin is full, and allowed to flow upon the emptying of the basin.

[Printed, 10*d*. Drawing.]

A.D. 1855, June 15.—N° 1368.

LEE, WILLIAM.—(*Provisional protection only.*)—"Improve-" ments in water-closets."

This invention relates to the service boxes of water closets.

"The improved service box consists of a suitably shaped reser-" voir, subdivided into three compartments or chambers by " suitable partitions. In one of the chambers is fitted a float, " which is connected by any suitable mechanical contrivance with " the service supply cock. The partition which divides this " chamber from the next one extends from the top to within a " short distance from the bottom of the reservoir, in order to " form a free communication between the two chambers so divided. " In the next chamber is fitted to work a piston, having an " opening formed in it, which is closed by a valve opening up-" wards; this piston is connected with the flushing handle or " pull of the closet. The third compartment is separated from " this last compartment by a partition, which extends from the " bottom of the reservoir to within a short distance from the top, " and contains a funnel-mouth opening downwards into the " flushing pipe. When not actually in use, the two first-men-" tioned chambers are filled with water to within about half an " inch, more or less, below the edge of the division which separates " the last-mentioned chamber containing the funnel from the other " chambers. In this state the service cock will be kept closed by " the elevated position of the float, but when the piston is drawn " up for the purpose of flushing the closet, the whole of the water " above it will be raised and caused to flow over into the funnel " mouth, whilst at the same time the float will descend and open " the service cock, which will keep open until the proper quantity

" of water has entered the service box, and the float consequently " assumed its original position. As the piston descends again, " its valve will open, and allow the water to pass through it to " its upper side ready for the next flushing."

[Printed, 4*d*. No Drawings.]

A.D. 1855, June 19.—No. 1401.

JOHNSON, John Henry.—(*A communication from Jean Pierre Louis Florimond Datichy.*) — " Improvements in machinery or " apparatus for emptying cesspools and privies."

A wrought-iron vessel is mounted on wheels and is capable of being transported to any desired locality. This vessel is connected with air pumps, "which are worked by the motion of the " running wheels during the travelling of the apparatus." By this means a vacuum is formed inside the vessel by the time it has arrived at its destination. A hose being then screwed on to a nozzle which is furnished with a valve, and its free extremity being placed in a cesspool, the whole of the contents are drawn up into the wrought-iron vessel upon the opening of the valve; the gases from the soil enter two other tubular chambers in communication with the main receptacle. An indicator shows the amount of vacuum in the receptacle, and an alarm whistle and suitable valves prevent " any dangerous excess of the same."

Two vertically mounted air pumps are driven by eccentrics which are loose upon the main axle; studs in the naves of the driving wheels rotate the eccentrics. The pumps are double-acting and they are fitted with four valves, two for the suction, and two for the discharge of the air. The valves are furnished with helical springs to prevent the jolting of the apparatus during transit from affecting them. When the apparatus arrives at the place of discharge, a disc valve is opened and a cover being removed from the exit pipe, the soil flows rapidly out by its own gravity. A box containing two valve seats and two valves on one spindle, with a suitable helical spring, prevents the pressure from becoming too great, and when this maximum pressure is reached the valves admit air and at the same time cause the whistle to sound by the suction. When the normal pressure is restored, the lower valve closes. The combined valves thus regulate the degree of vacuity.

[Printed, 10*d*. Drawing.]

A.D. 1855, July 2.—N° 1494.

TOOTH, WILLIAM HENRY.—" Improvements in the machi-
" nery for and in the manufacture of earthenware and plastic
" articles, and in the preparation of clays and other materials."

These improvements "have reference to forcing clays through " dods or dies to make a series of holes with a single core of " various shapes in bricks and sewer blocks, and in making " drain pipes and tiles and other articles of plastic materials."

Among the articles manufactured, a method of making water closets is described. This method refers to those water closets set forth in No. 12,465 of the year 1849. The inventor causes " presses to be made to force clay and other materials into dies " or moulds to form traps and plugs, and lathes with suitable " shafts, levers, bars, and rubbers to grind the same, so as to " make them perfectly air-tight, and to prevent any effluvia from " rising therefrom."

[Printed, 8*d*. Drawing.]

A.D. 1855, July 6.—N° 1519.

MORRIS, WILLIAM RICHARD, MORRIS, WILLIAM, CHRIMES, RICHARD, and ESKHOLME, GEORGE. — " Improvements in the construction and arrangement of apparatus " for preventing the waste of water from service pipes or cisterns."

According to this invention, the supply valve is not under the immediate control of the party opening such valve, and it closes after a certain quantity of water has flowed through it.

In one plan, a float chamber communicates, either by means of a bottom valve or of a hanging valve, with the main cistern. A float (the "supply box") in the main cistern is immediately connected with the lever that works the supply valve. The raising of the handle raises the float (the "closet box") in the float chamber, and lowers the water level therein. When the level of water in each chamber is the same, the supply valve is opened, and the proper amount of water is admitted to the closet; this quantity is regulated by apertures in the float attached to the handle.

In another plan, the valve lever is connected at one end to the supply vessel, the weight of which is more than counterbalanced *by a weight*. The closet vessel is connected to the handle, and, when drawn up, fills the supply vessel. This weight overcomes the counterbalance weight, and opens the supply valve, which will keep open until the counterbalance weight can descend.

In a third plan a double bellows operates upon the supply valve.

In a fourth arrangement, a self-inflating elastic ball or elastic balls operates or operate the said supply valve. This is employed in connection with a piston.

In the last method, a self-inflating elastic ball is used in connection with an air cylinder and piston. The valve remains open until the air above the air piston has escaped through a small opening. This arrangement is worked by the depression of the air piston.

[Printed, 10*d*. Drawing.]

A.D. 1855, July 19.—N° 1638.

STOCKER, SAMUEL.—" Improvements in water-closets, and in " pumps and cocks for supplying water to the same, and for " other similar purposes."

1st. Arrangements for effectually cleansing the closet, and in which the basin may be removed without interfering with the water supply. In the first arrangement, a portable basin fits into the cover of the container. The pan is worked by a spring bell crank connected to the handle. The supply pipe fits into an arm in the upper part of the basin. In the second arrangement, the basin is formed with a trap and has an arm at the lower part of the basin as well as one at the upper part. In the third arrangement, a portable basin is placed within the trapped basin.

2nd. Lift or force pumps for the supply of waterclosets. The standard is made of cast iron and the head of the pump forms the valve box and is annexed to the standard. The rising main runs up at the back. The working barrel is made of locomotive or seamless tube, which is kept in its place by means of a screw and nut. An arm, fastened by a bolt and nut to a lug on the standard, forms the bearing for the pump handle; by loosening the nut, the arm and handle may be turned round, so as to work the pump right or left handed. The valve box has a stuffing box and contains a circular valve. Another pump is shown securely fixed between two ascending mains. These and other *pumps that* are described are applicable to beer engines.

3rd. Cocks to be used in the above-mentioned pumps. The barrel of the cock has a partly hollow rod which works in a stuffing box at its inner extremity. A flexible material at the end of the rod presses against the end of the cock and prevents leakage. The strainer may be of perforated metal. A staple, fixed on to the pump, receives a nut on the front part of the cock and thus fixes it.

[Printed, 8*d*. Drawing.]

A.D. 1855, August 27.—N° 1934.

ROBSON, JOHN WOORDSWOORTH. — (*Provisional protection only*.)—" Improvements in waterclosets."

These improvements, which relate to self-acting closets, consist in " the application and arrangement of a flexible diaphragm and " tube of the same material, which, in connection with a metallic " pipe, are worked by the ordinary lever of the seat, thereby " operating upon valves arranged for the supply of water from " the cistern to the pan of the closet."

These improvements also consist " in the application of the " flexible diaphragm to a conical pump, whereby valves are " operated upon, causing the soil to be drawn from the basin " and forced from the closet."

[Printed, 4*d*. No Drawings.]

A.D. 1855, September 10.—N° 2047.

SHARPE, EDMUND. — " Improvements in pans for water-" closets."

This invention consists in the construction of the said pans " with pipes or channels having a series of perforations or " openings for the escape of water therefrom, such pipes or " channels extending partially or entirely around the upper " part of the pan." Instead of a series of perforations, one continuous opening may be used, " varying in width and shape, " for the purpose of securing a differing and definite amount " of water to pass over the various portions of the inside surface " of the pan." These pipes or channels may be formed separately and afterwards attached to the said pans.

[Printed, 6*d*. Drawing.]

A.D. 1855, September 17.—N° 2091.

GRAY, JOHN.—" An improved water-closet arrangement."

This invention " *is* intended to produce a deeper and more " *perfect trap, and to* cause the closet to be discharged by

" syphonic action in a full volume and with a flush." To effect these ends, there is substituted for the present closet trap, "a " pipe of metal, earthenware, or other suitable material, so " formed that it constitutes a trap to the closet much deeper " than the ordinary trap; and that when properly supplied with " water, either directly through one of its extremities," "or " through the closet pan, or through both, its discharging end " acts as a syphon, and draws off the contents of the closet solids " and liquids, the syphon discharging same through its long leg " in such force and volume as to flush the soil pipe and drain, " into which the contents may be discharged, so as more or less " perfectly to prevent obstructions or accumulations."

The drawings show a flushing pipe connected to the cistern and so curved as to receive the closet pan at the lowest part of the bend. This pipe is then curved so that its lowest extremity delivers downwards and forms the long leg of a syphon; the place of the syphon bend determines the height of water in the pan. There is also a pipe from the cistern connected to the upper part of the basin, and also from the cistern, a dribble pipe with a very small bore, which is used "in certain cases, especially with " large pans, to restore the level of the water after the discharge " by the syphon, and to maintain that level till the next dis- " charge." A flushing pipe is shown connected to a three-seat pan.

The action of this arrangement is as follows:—On raising the cistern valve, the water passes into the flushing pipe and forces forward the liquid already there, so as to enable the upper bend of the syphon to be well filled and to cause the long leg of the syphon to act with power. The syphon continues to act while the liquid in the pan or in the pipes is supplied in sufficient quantity to fill its bore. After the action of the syphon has ceased, the water trap is increased in depth by the dribble pipe till it arrives at the upper bend in the syphon.

[Printed, 6*d*. Drawing.]

A.D. 1855, October 15.—N° 2300.

LEFTWICH, CHARLES.—(*Provisional protection only.*)—"Im- " provements in water-closets."

These improvements "consist in so constructing the mechanism " of water-closets as that the valve thereof shall be raised in the

" basin instead of being drawn downwards, as heretofore in use. " And this is accomplished by means of a segment arm connect- " ing the valve with a radius arm, moving on a centre, and " under the command of a lever fixed in the seat. By this " arrangement the requisite working apparatus for effecting the " purpose required is much simplified, and consequently less " liable to become deranged than others."

[Printed, 4*d*. No Drawings.]

A.D. 1855, October 23.—N° 2366.

GREGORY, Alfred, and JILLINGS, John.—" Improvements " in cleansing the basin or pan of water-closets, and in apparatus " for the same."

These improvements consist " in the mechanical application of " a brush, scraper, or wiper simultaneously with the rush of " water in the basin of the closet, in order to facilitate the " cleansing of the basin, and to remove any soil adhering " thereto which may not be removed by the rush of water." For this purpose, a number of cross levers in series and known as lazy tongs, are placed within the basin. These levers are worked by means of pinions on the axes of the upper levers. The pull handle, beside causing the flushing water to flow, is connected to the axis of the pan and to the said pinions by levers; therefore the emptying of the pan, the admission of water thereto, and the action of the brush are all simultaneous operations. The cross levers, when collapsed, " rise up close " under the seat and are hidden from view, but when extended, " the lower arms or levers impinge on and press against the back " part of the basin, and slide down in contact therewith. The " lower arms have brushes attached thereto, or a stiff leather " scraper or wiper, which effects contact with and presses against " the basin."

[Printed, 8*d*. Drawing.]

A.D. 1855, November 3.—N° 2460.

DAVIS, George.—" Improvements in apparatus for letting-in " or shutting-off water or other liquids."

1st. An improved arrangement of a portion of the cock for regulating the inflow of water, or other liquids, which is described in No. 2361 of the year 1854.—This cock acts by means of a lever and vertical spindle passing through a stuffing box. The lower part of the spindle has the valve fixed thereon; a washer and nut, screwed on to the extremity of the spindle, secures the box and washers that form the valve. The upper washer of the valve (made of india-rubber or leather) is pressed upwards by the pressure of water, to its seat, which is a metal ring in a horizontal plane; the lower washer (also of india-rubber or leather) is at the bottom of the brass box that protects the valve and serves to prevent concussion by the too sudden closing of the valve. Grooves are cut in the face of the box, the lower washer is pierced with a small hole, and grooves are cut in the bottom nut; by this means any liquid between the box and the washer escapes into a reservoir at the bottom of the tap. In applying this valve to water closets, the plug is attached to the lever of the valve.

2nd. Apparatus to prevent an undue flow of water into the pans of water closets.—The lift handle has a thumb and finger print to raise it by, the handle being flat, and its rod embedded at its sides in the grooves in the cup. This improvement is to prevent the handle from being tied or trigged up.

3rd. An arrangement of basin and trap for water closets.—The drawing shows the basin and syphon trap constructed in one piece, but the basin and trap may be made separately. The basin is concave at the back inside, and has a projection or groove formed at the bottom of the pan all round, a short distance from the water in the trap, "so as to prevent the water when let into "the pan by the action of the valve from running all round the "sides of the pan and trap without flushing the latter."

[Printed, 8*d*. Drawing.]

A.D. 1855, November 5.—N° 2476.

HAWKES, **Francis**, the elder.—"Improvements in the con-"struction and arrangement of water-closet apparatus."

"The first part consists of a meter, cistern, or box, which is "divided into three chambers or compartments. The first "chamber is designated as the supply chamber, which is supplied "from the main by means of a ball-cock; at the bottom of this "chamber a pipe is affixed to communicate with the second or "flushing chamber; to this pipe a valve is attached. The second "compartment or chamber is designated the flushing chamber,

" at the bottom of which a flushing valve is attached. The third " compartment is designated as the retaining chamber, which " communicates with the flushing chamber by means of a small " aperture in the side thereof. A leaver apparatus is attached to " the box, the motion of which is derived from a rising and de- " pressing seat, at the extremity of which a wire or chain is " appended, communicating with a leaver which connects the " valve of the flushing chamber with that of the supply chamber. " The second part consists of a metal cylinder or of any other " material, on the top part or cover thereof a closet basin is " attached, containing a metal ring, which is fixed to the inner " side, and is framed to support an axle to which is appended " arms, with balance weights at the extremity of one arm and a " valve pan at the other. The third part consists of a receiving " basin, with a grooved rim to hold and support the before- " described cylinder, containing also a metal ring similar to the " one before-described, constructed to bear an axle with balance " weights and pan. Also a neck or pipe to communicate with " the main drain."

An india-rubber air ball is attached to the weighted arm of the pan, which, on striking certain plates, prevents noise or shock to the cylinder. Under the balance plate of the soil pan is fixed a metal tube to contain one or more lead balls for the purpose of carrying down the soil pan.

[Printed, 8*d*. Drawing.]

A.D. 1855, November 5.—Nº 2482.

McGREGOR, PETER.—"Improvements in water-closets."

This invention relates to water closets that are intended for ships' use. A duplex valvular action is employed, so that a direct thoroughfare through the closet can never by any possibility occur, "the discharged matters being passed first through one " valve or aperture whilst communication through the second is " cut off, and then through the second valve or aperture whilst " communication through the first is cut off."

In one arrangement clack valves are used. The axes of these valves are worked respectively by weighted levers in connection with the pull or handle of the closet, the said handle being fixed to a rod that is free to move only in a vertical direction and that *has an "elongated box"* that acts directly upon the pin of the upper lever. The valve at the bottom of the basin or pan opens into a chamber, also provided with a discharge aperture, to which is fitted the second or underneath valve. A short lever, in connection with the upper valve, works the water supply cock.

In a second arrangement, slide valves are employed. These are worked by a rocking shaft and slide valve rods; as the axis of the rocking shaft is between the two valves, when one is open the other is shut. The handle of the water closet is a lever that works on a shaft; the said shaft is in connection with the rocking shaft by means of a weighted lever and link.

In a third arrangement, a cylindrical vessel, immediately below the basin, has a horizontal axis passing through it. A diametrical valve piece is fixed upon the said axis, and works fluid tight in the vessel; its diametrically opposed ends are made sufficiently wide to cover the aperture in the basin as well as that into the soil pipe. This is worked by a lever closet handle and a weighted lever.

[Printed, 10*d*. Drawing.]

A.D. 1855, December 10.—N° 2788.

JENNINGS, JOSIAH GEORGE.—"Improvements in connecting " earthenware rain pipes and soil pipes of water-closets, and in " valve water-closets."

"For the purpose of connecting earthenware pipes for con- " ducting off rain water from buildings and the soil from water- " closets, cast-iron sockets or junctions of a peculiar form are " used. Each socket or junction is cast with an internal rib or " projection of the thickness of the earthenware pipes which are " to be fixed into it, and on the outside there is a lug or lugs " to fix the junction or socket to a wall or part of a building. " The junction or socket is fixed to the end of an earthenware " pipe in the following manner:—There is a groove around and " near the end of the pipe, so that when the end is introduced " into the socket, and melted asphalte or cement is run into the " socket between it and the pipe, there will be a good joint " formed. In fixing the end of another pipe into the socket, a " flexible washer or ring of vulcanized india-rubber is placed on " the projection in the socket, and the whole of the surfaces are " coated with red lead or suitable cement, and then the end of " the other earthenware pipe is introduced, and a sound joint

" is made. And in making with surfaces of valve water-closets, " in order to ensure waterproof contact at all times when the " valves are shut, a ring or surface of vulcanized india-rubber is " applied to the seat of each valve, and in addition thereto a " ring or surface of vulcanized india-rubber is applied to the " valve itself, in such manner, that when the valve is shut, the " two rings or surfaces of vulcanized india-rubber come together " and form a good joint."

In the drawings, the valve which closes the bottom of the water closet pan or basin, is pressed against the bottom by means of a weighted lever, which acts on the slotted lever fixed on the axis of the valve "so as to ensure waterproof contact and a perfect " joint between the two parts when they come together."

[Printed, 10*d*. Drawings.]

A.D. 1855, December 11.—N° 2792.

DE MALBEC, JACQUES ELIDAT.—"Improvements in water-" closets."

This invention relates "principally to the closing apparatus " or obturator, and the manner in which water is supplied."

The basin is nearly of a cylindrical form, being made up of two hollow cones meeting at their least diameters, the upper part being the widest and shallowest, and the lower part the most nearly cylindrical and the deepest. The valve or pan is shallow and covers the whole of the wide bottom of the basin. The rocking lever mechanism for working the pan and admitting water is enclosed in a case. The basin is placed within a tank which does not quite reach to the top of the basin and which is not quite so deep. The above-mentioned case forms a recess in the tank. The valve works upon an axis and opens into a chamber or container underneath the basin. The tank being hermetically closed, and a pipe therefrom dipping into the valve, the opening of the valve enables air to enter the tank through an air pipe, and water to be admitted to the said valve. Means of charging the tank with water, by means of a capped orifice and a plug connected therewith by means of levers, is set forth. When the valve is closed no more air can enter the tank and the supply of water to the valve is therefore stopped.

This method of supplying water may also be adapted to wash stands, &c. The drawings show various modifications of the lever apparatus by which the valve is worked, and this is also applicable to wash stands.

[Printed, 6*d*. Drawing.]

1856.

A.D. 1856, January 3.—N° 16.

WILLIAMS, George.—" Improvements in the construction of " waterclosets for ships."

" In the waterclosets now generally used on board ship the " soil is carried off by the ordinary straight leaden shoot; this is " very objectionable, from its allowing the sea water to rush up, " and also from its being exposed to the action of the wind, " which spreads the smell about the ship. To remedy this, I " construct the closets with an outlet, furnished with a syphon " and self-acting angle valve, which, while allowing the soil to " pass, will effectually prevent the passage of the water, and also " resist the action of the wind."

[Printed, 8*d*. Drawing.]

A.D. 1856, January 21.—N° 160.

ROBSON, John Wordsworth.—" Improvements in ma" chinery appertaining to water-closets and pumps."

1st. A conical vessel, called by the inventor a "conical cy" linder," is made to act as a pump, by means of a diaphragm, which forms the second improvement. This vessel is connected to the basin by certain pipes which are cast on to the said vessel. In the pipes are hinge or clack valves, one of which opens from the basin into the pipe, outwards from the basin, the other opens from the pipe into a rectangular bend that leads to the soil pipe, the latter valve opening outwards towards the soil pipe. The water closet handle is connected, by means of a rod, immediately to the diaphragm of the pump, and when the handle is raised, the soil and water are drawn from the basin, when it is depressed they are forced into the soil pipe. There are no bed plates, or screws used in this method of fixing, except to secure the pan or basin to the first of the said pipes; this is done by three bolts.

2nd. The manufacture of a diaphragm.—"This diaphragm is " formed of leather, india-rubber, and gutta percha. The leather

" is first deprived of all dressing or oily substance by being " placed in a solution of caustic alchali, is then moulded into its " proper form, and when dry, immersed in a solution of india- " rubber or gutta percha, or a substance of each may be placed " above and below or between as many thicknesses of leather as " may be required to give additional strength to the same."

3rd. A self-acting service for water-closets.—The service box is placed at about the level of the seat and communicates with the cistern above by means of a vertical tube or service pipe. The two valves are fitted on the same spindle, and are brought into action by means of a sliding tube worked by a lever attached to the movable seat. When the closet is used, the sliding tube is raised into contact with the lower valve and lifts the upper valve. On the return of the seat to its original position, the upper valve closes and the water passes through the lower valve to the basin.

[Printed, 8*d*. Drawing.]

A.D. 1856, April 11.—N° 866.

HENDERSON, Henry.—(*Provisional protection only.*)—" Improvements in water closets."

This invention relates to a method of applying water to closets direct from the main and without the intervention of a service box. The regulating apparatus consists of an india-rubber bag. This is connected with the supply valve in such a manner that when the closet has been used, a weighted lever on the supply valve spindle tends to press down the spindle and compress the bag. There is a small hole in the bag, through which, on the withdrawal of the pressure, air enters and distends the bag. When the supply handle is returned to its normal position, the external pressure comes again on the bag as the air in it escapes. The time the air takes to escape, which is in proportion to the size of the aperture, is the measure of the time taken by the supply valve to close.

[Printed, 4*d*. No Drawings.]

A.D. 1856, June 6.—N° 1348.

HARLOW, Robert. — " Improvements in the construction of " waterclosets and in valves or taps for for waterclosets and " other purposes."

" The nature of my invention consists, first, in an improved " self-acting watercloset, the seat of which when depressed opens " a tap or valve to admit water into a tube furnished above with " a ball valve, which closes the air passages when the tube is full, " and when the pressure is removed from the seat the water in " the tube is admitted into the pan to cleanse it out.

" Secondly, in the application of the improved ball valve above " referred to, to the cisterns of other waterclosets, and other " purposes.

" Thirdly, in the application of a tube of vulcanized or other " preparation of india-rubber placed around the spindle of valves " or taps within the valve chamber, whereby the stuffing box is " dispensed with and the valve raised off its seating when " required.

" And, lastly, in the application of a ball clack made of vul- " canized india-rubber or other suitable material placed between " the orifice of the pipe to be supplied and the end of the supply " pipe."

[Printed, 8*d*. Drawing.]

A.D. 1856, July 4.—N° 1572.

HOWARD, Robert Luke.—" Improvements in valves for " regulating the flow of fluids."

This invention is more particularly applicable to water closets.

" The improvements consist in the employment of a disc valve " (which constitutes the supply valve) faced with leather or other " suitable material, in conjunction with a valve piston " " working " water-tight in a short cylinder. The cylinder is closed at " the bottom, and the piston which works within it is composed " of a ring, through the centre of which is passed the stem of a " valve, a free passage being left between the stem & the inner " surface of the opening." Immediately above the piston, " and fixed on the stem, is a conical valve, which fits on to the " opening in this piston, this opening serving as a valve seat to " the conical valve. A stop is fixed on the bottom of the stem to " prevent it from being drawn through the piston when pulled up " to open the valve. The upper edge or lip of the cylinder forms " the seat for the supply valve, and when this valve is down no " water can enter the closet, the inlet or supply pipe opening into " the cylinder below the valve; but when the pull is drawn up to

" flush the closet, the supply valve is raised and the piston is " drawn up with it. The act of drawing up the piston opens the " conical valve contained therein, and allows the water to enter " below the piston by the central opening formed in it. When " the pull of the closet is pushed down, the supply valve and " piston descend by the action of a weighted lever, and the " descent of the valve stem closes the conical valve on the piston, " whereupon the water contained below it can only escape by " means of a small groove or slot made down one side of the " conical valve or its seat."

[Printed, 8*d*. Drawing.]

A.D. 1856, July 8.—N° 1601.

YOUTMAN, William.—" Improvements in valves and plugs."

This invention may be applied to water closets.

This invention relates to the adaptation of a shield or guard having a tongue or valve of flexible material to outlets and passages for liquids. "The shield or guard consists of a kind of " flange or cap, covering the mouth of the pipe or other orifice, " such flange or cap having an opening or passage way larger " than the mouth of the pipe or other orifice, so as to form a seat " for the tongue or valve of vulcanized india-rubber or other " suitable material against the end of the pipe, and the tongue or " valve being secured to the flange or cap in such a manner as to " admit of the passage of liquids and excrements outwards but to " prevent the admission of water or currents of air inwards."

[Printed, 6*d*. Drawing.]

A.D. 1856, August 22.—N° 1960.

PATTEN, William.—(*Provisional protection only.*)—" An improvement in apparatus for supplying water to the basins of " waterclosets and other vessels."

" The supply pipe has attached to it a chamber or valve box, " which is divided by a partition in which is a passage covered by " a valve, the stem of which passes through a suitable stuffing " box. The other part of this chamber or valve box is connected " with the basin of a watercloset." " It is preferred that the " valve box or chamber should be in two parts with flanches " screwed together."

[Printed, 4d. No Drawings.]

A.D. 1856, September 12.—N° 2140.

ELLIOTT, John.—" An improved apparatus for containing and " supplying water, gas and other fluids, applicable also as a fluid " meter."

This invention "has for its chief objects to allow of water, " liquors, gas, or any other fluids or semi-fluids, being withdrawn " from vessels of any ordinary suitable form, without the admis- " sion of atmospheric air to their contents." The apparatus may also be employed for flushing water closets.

A flexible waterproof bag is affixed to the inside of a rigid or semi-rigid vessel, so that the flexible bag "shall by its own " weight and the pressure of the atmosphere, be forced to the " sides of the containing vessel, and down on the fluid or semi- " fluid contents as they leave the containing vessel, thus allow- " ing them to be drawn off without admission of the atmosphere."

The drawings show a cylindrical vessel fitted with the said flexible bag, and having a hoop round a ring at its upper part, in order to secure the bag thereto. In another plan suitable for flushing water closets, the containing vessel is spherical, and the waterproof sheet is secured to the flange which joins the upper hemisphere to the lower hemisphere. This arrangement is worked with a two-way cock, one aperture of which leads to the supply cistern, and the other is the outlet pipe. The two-way cock has a shutting leaf with a handle and pivot, so that one aperture is shut before the other is opened. To make the cock self-closing, the handle is weighted at the end.

[Printed, 6d. Drawing.]

A.D. 1856, September 16.—N° 2166.

BROOMAN, Richard Archibald.—(*A communication from P. Saroglia and V. Belli.*)—" Improvements in waterclosets and " night stools."

" Below the seat is a reservoir for water communicating with " a smaller reservoir, which itself communicates with the pan. " The bottom of this pan consists of a metal or other cap or trap, " which closes the pan when shut, but is so constructed as to " open downwards into a receiver beneath." " Communication " between the receiver and the drain or receptacle is closed by a " cap or trap, similar to that before mentioned, and connected " with it by a chain and rod in such manner that when one is " open the other is closed, and *vice versâ*. The traps are con-

" nected by rods, levers, and a shaft or axis to the seat, so that " on a person pressing on the latter the levers depress the rods " and turn the shaft, thus opening the upper cap and shutting " the lower one. The motion of the seat also operates two taps, " so contrived that when one is open the other is shut. The " degression [depression ?] of the seat first opens one of these " taps, and thereby admits water from the larger to the smaller " receiver; but when the upper trap opens, the water that was in " it flows from the pan down into the receiver beneath. When " pressure is removed from the seat the said trap is restored to " its position by a counterbalance weight or by springs, the lower " one being simultaneously opened; the fecal matters are thus " allowed to pass into the drain or receptacle. At the same time " the second of the traps is opened, and the water from the " second reservoir flows into the upper or closed trap to seal it " and prevent the escape of noxious gases."

[Printed, 8*d*. Drawing.]

A.D. 1856, October 8.—Nº 2360.

WATSON, Henry, and DIXON, John.—"Improvements in " cocks and valves."

"A plug or valve works up and down in a chamber which it " nearly fits, and on its under side is a facing of leather, metal, " or other suitable material, which, when the valve is in its lowest " position comes in contact with a metal seat and so closes the " waterway, but when the valve is raised (by a lever acting on " the spindle of the valve) the water is able to pass freely. The " spindle of the valve passes through a hole in the centre of a " disc of elastic material so as to make a tight joint. When the " valve is down, there is a vacant space in the upper part of the " chamber in which it works, which becomes filled with water, " the valve not completely fitting the chamber; as the valve is " raised by the handle the water is expelled from this space, " and when the valve is left free it cannot descend until this " space is refilled by water passing up between the valve and the " sides of the chamber; and thus the descent of the valve is " rendered gradual," and the injury caused to pipes by the too sudden closing of valves is thereby prevented.

The drawings show this invention applied to a cock for a water closet, to a bib cock, and to a ball cock.

[Printed, 6*d*. Drawing.]

A.D. 1856, October 28.—N° 2528.

MARIE, Jean Louis.—" Improvements in raising, propelling, " and forcing water and other fluids, and in obtaining motive " power."

These improvements comprise " the general arrangement of " machinery and apparatus for the expulsion of water from " tanks and other vessels, and for the elevation of water from " mines, quarries, cesspools, etc." Compressed air acts in connection with a vessel immersed in the fluid to be raised. A peculiarly constructed tap also forms a part of this invention; this tap regulates the admission of compressed air to the vessel, and its exit therefrom, by means of orifices, which are so arranged that when two are open, the other two are closed.

The vessel has two compartments. Each compartment is provided with an inlet valve at its bottom, and with a tube for the exit of the fluid or matter. Each exit tube has a float valve opening upwards, which closes the exit passage whenever the water is below the level of the said passage. The compressed air enters a box which is properly secured to the top of the cesspool, and passes through the tap mentioned above to one or other of the compartments, according to the position of the balance rod which actuates the tap. The balance rod is operated alternately from either compartment by means of pistons that work in cylinders, to which the air from each compartment has access as soon as it attains a certain pressure. On immersing the said vessel in the cesspool, the fluid rises to its own level in the vessel. The air is then pumped in and closes the bottom valve of the compartment which it enters, at the same time forcing the liquid up the exit tube until the water is below the exit passage, which is then closed by the float valve. The air cylinder valve is then opened, the tap admits the air to the other compartment, where the same operation takes place, and the first compartment (by the exit of its air through the tap) is again filled with fluid ready for removal, and so on, until the cesspool is emptied.

[Printed, 8*d*. Drawing.]

A.D. 1856, December 9.—N° 2921.

CARR, William Seggie. — (*Provisional protection only.*)— " Improvements in waterclosets."

The seat of the closet, or a handle and lever, is made use of to actuate the parts to which these improvements relate, which are a cock to supply water and a means for emptying the pan. The cock "is formed by a valve opening against the supply of water, " which when moved allows a dash of water to pass into the " other parts of the cock, and then a cylinder comes into the seat " of the valve, shutting out the water until the power acting on " the valve rod is removed, and the cock closes gradually by the " pressure of water and a spring, the time for closing being regu- " lated by the escape of water out of a small opening in a " cylinder, wherein is a cup leather moving with said valve, thus " allowing water to run through the closet the required time for " cleansing the same.

"The pan is emptied by an arrangement of latches and lever, " acted upon by hand or the valve rod of the cock in such a " manner that the pan is dropped and the contents emptied, and " then said pan is held in this position while the closet is washed " out, and then allowed to return to its place beneath the basin " and there retained, and the flow of water just before it is " finally shut off is sufficient to fill said pan and exclude smell."

[Printed, 4*d*. No Drawings.]

1857.

A.D. 1857, January 12.—N° 102.

ESKHOLME, George, and **WILKES**, Henry.—"Improve- " ments in apparatus for preventing waste of water from service " pipes and cisterns."

This apparatus is particularly applicable to water closets.

"The body of the apparatus consists of a cylinder fitted with " a piston. On the lower end of the stem of the piston is fitted a " double-faced valve, the seat of which is situated between the " two faces. When this valve rises or falls, so as to bring either " the one or the other of the two faces on to the valve seat, a flow " of water will pass into the closet, such flow continuing only " during the time that the valve occupies in rising or falling. " The movement of this valve is controlled in the following " manner:—The inlet pipe leading from the service pipe or main,

" opens into the cylinder below the piston, which is of larger area " than the valve, and consequently the pressure tends to elevate " the piston and raise the valve, unless an equilibrium of pressure " be established on both sides of the piston. For this purpose a " waterway leads from the inlet pipe to the interior of the cylinder " above the piston, and this waterway is capable of being opened " or closed by means of a conical ground plug, the handle of " which answers as the pull of the closet. A second waterway, " similar to the first one, leads from the upper end of the cylinder " above the piston to below the seat of the double-faced supply " valve." "The conical plug or cock is so constructed that by " turning it partially round, one of these waterways will be made " to communicate with the top of the cylinder and the other will " be shut off therefrom."

The amount of water to flow down the closet is regulated by means of an adjustable screw plug having a conical or tapered slot formed therein. This small plug is screwed into the opening in the conical plug; the size of the orifice is thus diminished or increased.

[Printed, 6*d*. Drawing.]

A.D. 1857, January 24.—N° 222.

STUBBS, William, and BURROWS, James.—" Improve-" ments applicable to waterclosets."

The object of these improvements is the supplying of water to closets direct from the main, and the doing so without any waste. This is effected "by the means of a small enclosed chamber, " through which the water to be used passes; the inlet and outlet " of this chamber being regulated by a two-way cock, or a valve, " which by one motion opens one passage and cuts off the other, " that is to say, suppose the supply port is open, by the action of " closing it the discharge passage is opened, and by the reverse " action the outlet is closed, and the supply passage opened. The " small chamber is provided at the top with an air valve, to be " worked by the action of the water in any convenient manner, " say, such as a floating ball valve."

Above the floating ball valve "is a small cylindrical chamber " to receive any escapement water which may arise in consequence " of the valve not being sufficiently tight against its upper seat." The outlet passage is kept closed by means of a counterbalance weight, unless it is purposely opened either by hand or by a chain pull.

[Printed, 6*d*. Drawing.]

A.D. 1857, February 3.—N° 307.

RAYNER, Thomas William.—" Improvements in cocks and " valves."

These improvements refer principally to cocks and valves used for water closets, baths, and like purposes.

" I construct a cylinder," " somewhat similar to a pump barrel, " the top of which has a cover with a stuffing box, through which " a piston rod with a handle passes, and has its bottom end " attached to a slotted double tumbler; and the piston rod " having a spiral " [helical?] " or other suitable spring secured " to it, will, when pushed down by the handle, return again to its " place. Within the barrel, under the stuffing box and fixed to " the rod, is a solid piston or valve, which being opposite or " below the aperture of one or more cocks, closes or shuts them " off until opened by the descent of the rod and consequent " passage of the valve below the opening of the service pipe." " The lower end of the rod has a weighted slotted lever, through " which a spindle passes to the closet valve or other valves; or a " spring may be substituted for the weight."

[Printed, 6*d*. Drawing.]

A.D. 1857, February 10.—N° 390.

BRIDGWOOD, Jesse.—(*Provisional protection only*.)—" Im- " provements in connecting pipes to the basins of waterclosets " and wash-hand basins, and also in the means of stopping the " outlets of wash-hand basins."

The basin is made with a short projecting tube of earthenware or china, and a screw thread is formed thereon to receive an earthenware or china nut. "The supply pipe is formed with a " flanch, which is received on the interior of the earthenware or " china screw nut, so that when the screw nut is screwed on to " the " " tube, formed with the basin, a soft washer of leather " or other suitable material will be pressed closely against the " end of the screw tube, and against the surface of the flanch."

" In closing the outlet holes at the bottoms of wash-hand " basins, spherical stoppers of earthenware, china, glass, or stone “are used, ground into the holes, so as to produce spherically-formed seats for the spherical stoppers.”

[Printed, 4*d*. No Drawings.]

A.D. 1857, February 13.—N° 426.

LAMB, David Alexander.—“Improvements in waterclosets, and in apparatus connected therewith.”

These improvements relate to the supplying of a regulated quantity of water to the basins of closets. “Beneath the seat is fitted a stud, which is depressed by the sinking of the seat; this stud is connected with a lever which opens the inlet tap of the cistern or supply box, and closes the emission valve of the basin. When the pressure on the seat is removed, the supply tap is closed by a metal float, and the emission valve in the bottom of the cistern opens and discharges the water contained in the cistern into the basin. The quantity of water discharged is regulated by the size of the cistern or supply box. The foregoing arrangement is applicable to either high or low pressure service.”

According to the drawings, the rod or stud is connected with a weighted lever under the seat, which, by means of a vertical rod, and another lever supported above on the service box, ordinarily tends to keep the emission valve from the service box completely open. The said lever on the service box is connected with the conical inlet valve by means of a rod and lever. The lever carries the above-mentioned metal float.

[Printed, 6*d*. Drawing.]

A.D. 1857, March 11.—N° 707.

BODEN, William.—(*Provisional protection only.*)—“Improved apparatus for flushing waterclosets and urinals.”

“I mount in a case a tumbling bucket into which water from a cistern runs at any required rate, regulated by means of a tap, the plug of which carries an index hand for indicating the rate of the discharge. From the bottom of the box containing the bucket depends a pipe, which is intended to guide the water to the pan or other vessel to be cleansed. When water has accumulated to the required extent in the bucket, it will, by reason of its load, lose its balance, and tipping over, discharge its "contents into the surrounding case, whence the water will run "down the pendent pipe and flow into the pan or vessel below."

[Printed, 4*d*. No Drawings.]

A.D. 1857, March 26.—N° 847.

TOMASINI, Domenico.—"Improvements in the construction "of easy chairs and chamber commodes."

1st. The application of a spring to the back of an easy chair, so that it may be made to press against and support the lumbar region of the back of the person seated in the chair.

2nd. "An improved mode of adapting a night convenience to "an easy chair."—Beneath the movable cushion of the chair is a movable wooden seat with a hole therein, and beneath this is the movable commode. The said commode consists of a soil pan with a valve and a lower reservoir. The hollow back of the chair forms the supply reservoir, which effects a communication with the movable pan by means of a flexible pipe provided with a cock for injecting water into the pan. "The square of the "spindle of this cock is inserted into a socket provided with a "lever, whereby the socket and the cock fixed therein is turned "to allow water to flow through the flexible pipe. This socket "is also provided with another lever or arm, whereby the valve "of the pan is worked so that the valve and the water supply "may be both brought into action simultaneously. The socket "is worked by means of a cord or chain, attached at one end to "one of the levers, and provided at the other with a button, "which is placed near the fore end of one of the arms of the "chair. If a slide valve is used for the pan, I place a piece of "sponge behind it for the purpose of cleaning the same every "time it is drawn back, and a small stream of water is thrown "on to the sponge whenever the valve is opened."

[Printed, 8*d*. Drawing.]

A.D. 1857, March 27.—N° 863.

ROSS, William.—"Improvements in apparatus for regulating "the passage of fluids."

This apparatus, as applicable to water closets, "consists of a "hollow flexible and fluid-tight ball, or bag of india-rubber," "disposed in the interior of a spherical metal case. This flexible "*ball is unconnected* with its containing case, except at the

" bottom, where there is an aperture in it coinciding with a " small pipe, which opens at that part into the metal chamber. " The water for the supply of the closet is conducted into the " metal chamber by a wide pipe on the top, and it is discharged " by a correspondingly wide lateral branch, which passes to the " closet pan or soil receiver. This lateral branch is also on the " upper side of the metal chamber, and its junction with the " chamber is guarded by a perforated shield or bearing piece to " support the enclosed flexible ball against the effect of internal " pressure. The main supply pipe has a small lateral branch " from it, guarded by a stop-cock or valve, this branch being " connected at its other end with the small bottom pipe opening " into the bottom of the flexible ball. The junction here " is continued onwards in the shape of a single discharge pipe, " also governed by a stop-cock or valve. It is this latter valve " which is acted upon by the closet mechanism when the closet " is put to use." "The flexible ball answers in itself as an " excellent valve, in addition to its other power of regulating the " flow of the water by its flexible action. The apparatus may " obviously be varied in many ways for the obtainment of the " same or similar ends."

[Printed, 8*d*. Drawing.]

A.D. 1857, March 30.—N° 874.

TAYLOR, JOHN HORACE.—(*Provisional protection only.*)—" Im" provements in apparatus for regulating the flow of fluids " applicable to waterclosets and other similar purposes."

"The apparatus consists of an outer cylinder closed at the " top, fitted with a stuffing-box through which works the valve " spindle, such spindle being connected by a spring catch, or " otherwise, to a weighted lever connected with the handle or " pull of the closet, if used for that purpose."

"The regulating valve consists of a long cap or tube having a " small aperture at its upper end, and sliding water-tight, or " nearly so, over a tube, which is fitted at its upper end with a " small clack or valve. This latter tube is open at the bottom, " and is fixed by flanges or otherwise to the mouths of the inlet " pipe." "The lower portion of this pipe is perforated with " numerous holes up to a height corresponding to the stroke of " the valve, so that when the valve is elevated the perforations

" will be uncovered, and water will flow therethrough into the " outer casing or cylinder, and thence into the service or closet " pipe, which opens into it."

"The length of time the valve will remain open will obviously " depend on the size of the aperture through which the water " must escape, and this aperture may be regulated by a stop-" cock in connection with a dial and indicator, so that the appa-" ratus may be easily adjusted to allow any desired quantity of " water to flow through in a given time."

[Printed, 4*d.* No Drawings.]

A.D. 1857, April 6.—N° 967.

TAYLOR, John Horace — (*Provisional protection only.*) — " Improvements in regulating the flow of fluids."

" This invention relates to a peculiar construction and arrange-" ment of apparatus for preventing waste of water from the service " pipes of water-closets and cisterns, the supply valve being out " of the control of the party using the closet."

" The improvements consist in the employment of a cylinder " fitted with a piston and valve or ordinary pump bucket, which " is connected to the pull or handle of the closet. The lower " portion of this cylinder is always open to the main supply pipe, " whilst its upper portion above the piston or bucket opens into " a chamber fitted with a flexible diaphragm. On this diaphragm " rests a rod connected with a weighted lever which opens and " closes the closet supply valve. A diaphragm is also employed " in place of a stuffing box for keeping the spindle of the valve " water-tight. The bucket on being raised by lifting the pull or " handle of the closet forces a certain amount of water into the " diaphragm chamber, and elevates the diaphragm therein, which, " in its turn raises the weighted lever and opens the supply valve, " such valve being kept open until the water has escaped from " below the diaphragm, which may take place through a small " adjustable aperture, a valve serving to prevent the water " returning to the cylinder again."

[Printed, 4*d.* No Drawings.]

A.D. 1857, April 11.—N° 1018.

SMITH, Charles.—(*Provisional protection only.*)—" An appa-" *ratus to be used in* connection with certain domestic utensils."

This invention, "which has reference to the construction and "employment of an apparatus to be used in connection with "chamber utensils, consists in providing them with a suitable "cover, furnished with an air-tight concavity or flexible lip "passing round the peripheries of the same in such manner as "to hermetically close the vessel, and present a less unsightly "appearance than those at present in use."

[Printed, 4*d*. No Drawings.]

A.D. 1857, May 25.—N° 1462.

BULLOCK, THOMAS. — (*Provisional protection only.*)—"The "construction of waterclosets upon the principle of self-action "and self-cleansing, called the self-cleansing watercloset."

"The pan is fixed by its upper rim to the under side of the "seat, which is always raised when unused, so as to leave a sufficient space between the bottom edge of the pan and that part "of the trap called the shoe, to allow the contents of the pan to "flow through into the trap, and in this shoe is formed a basin "immediately under the bottom of the pan, the intention of "which is to hold water at all times between the bottom edge of "the pan, in the same way and for the same purposes as the "trap contains water." That which is claimed as specially novel is "the closing the pan at the bottom by the descent of the seat "and pan attached, and letting out the contents of the pan by "the rising of the seat and pan, and also the prevention of wind "getting into the pan."

[Printed, 4*d*. No Drawings.]

A.D. 1857, May 28.—N° 1515.

SIMPSON, ALEXANDER.—(*Partly a communication.*)—"A new "or improved slop and toilet pail."

According to this invention, the said pails are constructed "so "as to render them available as chamber commodes as well as "for the general purposes for which they are usually employed."

The invention "consists in causing the interior of the said "pails to be fitted or furnished with a pan of earthenware, or "coated with the same or similar non-absorbant materials, and "provided with an air-tight lid or cover for the purpose of preventing the escape of effluvia, the said cover being secured or "removed through the medium of a bayonet stop fastening."

The drawings show a toilet pail with the above-mentioned appurtenances. There is an elastic washer that forms an air-tight joint between the lid and the body of the pail. The pan is separate and removable. A spring catch valve is attached to the centre of the concave cover, for discharging the water from the said cover into the pail, and preventing the escape of effluvium therefrom. This valve has a helical spring for retaining the valve closed, and a thumb stud and box for actuating the same. The water escapes through perforations in the fixed portion of the valve. The bayonet stop fastenings are on an inclined plane.

The slop pail has an inner pan and jointed cover, but no spring valve; it may be put into a commode box having a seat and lid.

In the toilet pail, the water may by its own weight liberate the valve; and a small portion of the fluid may act as seal.

The chief points of this invention are:—1. The lining or pan. 2. The elastic washer. 3. The spring catch valve.

[Printed, 6*d*. Drawing.]

A.D. 1857, June 17.—N° 1695.

WARNER, Frederick.—"Improvements in supplying water "to waterclosets and other vessels."

The apparatus which forms the subject of this invention may be fixed on the top of the container of a pan water closet.

It is the combination of the parts, and not any of them separately, which forms the novelty of this invention, which is as follows:—"The stem of the valve on the supply pipe has on it a "plunger or piston with a cupped leather (or other material), and "such plunger or piston works within a chamber or cylinder "closed at its upper end. The stem or spindle of the valve is "made hollow, so that water may flow through it to the chamber or cylinder within which the plunger or piston works. On "the interior of the chamber is a fixed wire or rod, which enters "into the hollow stem or spindle of the valve, so that as the "valve is moved in order to open it, the stem or spindle thereof "slides on the fixed wire or rod, whilst at the same time the "plunger or piston on the spindle or stem of the valve is forced "into the chamber or cylinder, the water in such chamber or "cylinder readily passing the cupped leather in one direction "*but not in the other;* hence the valve will only close slowly,

" according to the space allowed between the hollow spindle " or stem of the valve and the fixed wire or rod on which it " slides."

[Printed, 6*d*. Drawing.]

A.D. 1857, June 20.—Nº 1722.

WRIGHT, William.—" Improvements in flushing apparatuses " applicable to cisterns and waterclosets."

Pressure on the water closet seat acts by means of weighted levers upon a "tongue" or valve, so as to close the pipe communicating with the basin and to open the communication between the supply cistern and the service box; thus, during the use of the water closet, the service box is being filled. A vertical pipe proceeds upwards from the service box to a flushing box (represented in the drawing as being partitioned off from the supply cistern) which is filled at the same time as the service box. Removal of pressure on the seat cuts off communication between the supply cistern and the service box, and opens the pipe connected to the basin, thus allowing the whole of the water in the service box, the vertical pipe, and the flushing box to be suddenly delivered into the basin.

The said tongue or valve is the only valve in the whole arrangement, excepting the ordinary ball cock in the supply cistern. The action of the levers is either to move this tongue upon its axis, away from the inlet pipe of the service box into contact with the outlet pipe, or *vice versâ*. The service box is small and more of the nature of a valve box than of an ordinary service box; it is close to the seat and rather above it. The flush box takes the place of the ordinary service box, and is (together with the vertical pipe and and valve box) always empty when the closet is not in use.

"The same apparatus can be attached to an air-tight cistern or " box to work by means of compressed air."

[Printed, 6*d*. Drawing.]

A.D. 1857, June 26.—Nº 1793.

LLOYD, John.—" Improvements in utilizing and deodorizing " sewage matters of dwelling houses and other places, and in " apparatus to be used in connexion with the same."

This invention consists in applying the waste of fire-places, alone or in combination with lime, to deodorise sewage and render it fit for manure. The principle of this invention is to separate the fæces from the urine, and to act upon each substance separately by the deodorising material.

The simplest closet to carry these principles out is a pan with a seat having a circular aperture, and the deodorising material so arranged as to form a kind of partition, the fæces falling behind, and the urine before the said partition, and there absorbed.

The next form, to be placed beneath the seats of closets, privies, and night chairs, is a square or rectangular pan with a curved partition. This pan may be introduced into its place when empty, and removed therefrom when full by means of passages. The deodorising materials are added by a ladle after each time of use.

In the third form, the partition is straight, and is met by a broad flat valve, thus preventing smell. This valve may be actuated by the water closet handle, or it may be self acting, the depression of the seat operating, by means of spring levers and a counterweight, to open the valve, and, by means of wheel gear, to revolve a cylinder with pockets, which thus supplies deodorising material during the closing of the valve.

The drawings also show arrangements for a three-story house, by which the solid evacuations are discharged into one common receptacle below. The fluids descend vertical pipes without soiling their sides. At the top of each channel for the solids, a closet sends down the deodorising powder with the evacuation. The front compartment is to be removable, and to be charged with the deodoriser; it has an overflow pipe discharging into solidifying sinks in the back yard, the overflow from the said sinks going into the sewers.

In a row of houses, trapped pipes convey the liquids from upstairs into large removable sinks supplied with deodorising material.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1857, September 30.—N° 2518.

HARRIS, JAMES.—" Improvements in and connected with " cocks and valves, especially adapted to preventing the bursting " of water pipes from frost."

" The bursting of pipes arises from the freezing of water therein, " and if no water is allowed to remain in them, then no bursting " *will take place.*"

One of the main features of this invention " consists in pro- " viding a valve or passage for the admission of air into pipes " in which water has been led," " in order to drive out the water " therefrom as soon as the supply is cut off." One movement of the lever of the said cocks and valves to a given distance will shut off from the main; further movement in the same direction will empty the service pipe.

A flexible diaphragm valve that is applicable to water closet cisterns has a case to the valve spindle, and an air pipe communicating with the exit pipe below the valve, which also acts as a waste pipe to the cistern. The valve rod may be made hollow, so as to form the air pipe. A regulating piston and cylinder may be attached to the valve lever.

Valves are described and shown that may be applied to the upper part of a service pipe to remove water therefrom in frosty weather. Ball cocks and three-way cocks that permit the service to be emptied by a final movement are also set forth and represented.

An apparatus for regulating the flow of water to a water closet consists of a clockwork fan or fly actuated by the pull which also works the valve. A spring catch, connected to the valve rod, when raised, catches upon the tail of a toothed sector which drives the fly pinion. When the catch is liberated the flow of water is suddenly checked. The flush of water thus continues up to the instant of shutting off.

" The improvements are also applicable to bib cocks and to " cocks and valves suitable for boilers, for water gauges, and for " supplying baths."

[Printed, 1s. 4d. Drawings.]

A.D. 1857, November 10.—N° 2836.

DEVON, William.—" An improved self-acting apparatus for " flushing waterclosets, and the means of connecting the same " to water mains, parts of which are applicable to the junction of " gas or water pipes generally."

The following portions of this invention refer to waterclosets and urinals :—

" An improved self-acting flushing apparatus for water closets " and urinals."—The cistern is furnished with an inlet pipe that has a small aperture, so that some length of time is required to fill it. The outlet pipe is connected to a bent tube in the cistern, by means of a vulcanized india-rubber tube that forms a flexible joint; the bent tube is curved downwards, so as to form a syphon, and is attached to an open hollow float or vessel that carries, an interior small syphon. As the water enters the cistern, the float and the bent tube are raised until the bent tube touches the cistern cover; the water then fills the float, and the float and bent tube sink to the bottom. The bent tube is then in a position to form a syphon in connection with the outlet tube, the cistern becomes speedily emptied and the closets flushed. The small syphon in the float then empties the float, the water again fills the cistern and the action of the apparatus is repeated.

"An improved flushing apparatus for waterclosets and urinals " in which there is no valve, and where the chain does not require " to be retained in the hand after being pulled.—A cistern with a cover and a bent tube with a flexible joint are employed in this case; a closed float is attached to the bent tube. The cistern is filled with water by means of an ordinary ball cock. The chain is attached to the weighted arm of a lever, upon the axis of which, in the cistern, another lever is fixed. When the chain is pulled, the inside lever forces down the bent tube, so that it can act as a syphon, until the float raises the tube above the level of the outlet. The cistern then again becomes filled.

[Printed, 10*d*. Drawing.]

A.D. 1857, December 3.—N° 3004.

PARSONS, William, and ATTREE, James.—"An improved " cock or tap and flushing apparatus."

The tap consists of a hollow conical plug, which fits vertically into a seat that receives the horizontal inlet pipe. The seat or hollow barrel is closed at the upper end and open at the bottom. To admit liquid, the plug is forced up; to stop the inflow, the plug is drawn downward into its seat, thus closing the aperture of the horizontal inlet pipe.

In the flushing apparatus, the above-described tap is fitted inside a cistern, and a float is made to act on its plug by means of a float lever. A lever, which has its bearings at the sides of the cistern, has the pull attached to it at its external extremity, and has a second lever centred upon its inner end. The rod of the outflow valve is connected to the second lever, and, at its outer end, the said second lever has a hook attached to it. This hook, *as the second lever is* raised, takes hold of the float lever and raises the float. When the pull is drawn down "the float is first raised "to close and to keep closed the inlet, and the outlet valve is immediately afterwards raised to permit of the discharge of the "whole contents of the cistern; on releasing the commanding "wire the outlet valve falls, the float also falls and allows of water "entering the cistern to the height regulated by the ordinary action "of the float."

To improve the flushing action of this apparatus, the cistern is formed with an inner bottom. The space between the two botboms becomes filled when the outlet valve is opened, and thus a sufficient outflow of water is secured.

[Printed, 6*d*. Drawing.]

A.D. 1857, December 14.—N° 3074.

BAIRD, ADAM.—(*Provisional protection only.*)—"Improvements in regulating the supply of water and other fluids for "domestic and other purposes."

The object of this invention is to remove cisterns, and apparatus connected therewith, out of the way of frost or other detrimental influences; also to regulate the whole of a number of cisterns by one valve action that is out of the way of frost and that may be kept under lock and key.

A supply cistern, having its pipes in the interior of the building, supplies a number of service cisterns, and ultimately, at the lowest point, a regulating cistern, within which a float works a valve on the supply pipe. The valve preferred is a ball-and-socket valve worked by the float lever.

In the case of a water closet, the depression of the seat closes the outlet valve to its cistern or "service chamber" and opens the inlet valve. The raising of the seat closes the inlet valve and opens the outlet valve, "discharging the water collected in the service "chamber into the pan of the closet." To prevent effluvia arising from the closet, the orifice of the soil pipe is covered with a movable curtain or slide "worked by a cross lever action, which is acted "upon by the under side of the closet seat, so that when there is "a weight thereon the slide is removed from the front of the soil "pipe, and so retained until relieved from the pressure of the "seat, after which it is retained open during the time the water "from the service chamber is rushing into the pan by means of a "tongue piece jointed to the front of the discharge orifice of the

" service vessel, which is forced by the action of the water to re-
" tain the cross levers and prevent them working until the tongue
" piece is relieved of the pressure of the water and allowed to fall
" to its vertical position, when the curtain drops down and covers
" the orifice of the soil pipe."

Other details respecting cisterns and valves are described.

[Printed, 4*d*. No Drawings.]

A.D. 1857, December 17.—N° 3095.

TURNER, MONTAGUE JOHN, and TURNER, MARCUS WILLIAM.—An invention for the "improvement of conduit pipes
" and tubes for sewers, drains, conduits, gas, and other purposes."

This invention "consists in the manufacturing of glass
" formed into conduit tubes or pipes and drains for the convey-
" ance of water and gas and for the main drainage for the sewerage
" of towns, for drainage pipes for stables, for watercloset pans
" and pipes, for mantlepieces in plain and variegated colours,
" chimney flues and chimney tops, and for the cornices and dress-
" ings for ceilings, and for pillars and columns as supports. The
" formation of the pipes, drains, watercourses, and gas pipes will
" be accomplished by the making and casting of hard block glass
" into moulds of the required size and in various lengths to suit
" the purpose for which it may be required, lipped and grooved
" at either end in the manner of screw to prevent leakage or
" escape, with or without cement. The pans and tanks will be
" simple casting."

[Printed, 4*d*. No Drawings.]

A.D. 1857, December 21.—N° 3127.

THRIFT, WILLIAM, and HIGH, ADAM.—"An improved self-
" acting ship's watercloset."

"We employ two levers, the one of which is placed in connec-
" tion with the seat of the closet, the other with the arm on the
" axis of soil valve, and also with the valve to admit the supply
" of water. These levers are placed in such relation to each
" other, that a catch suspended to the end of the first lever (that
" connected with the seat), when the seat is depressed and the
" catch raised, swings over stop or catch formed on the valve
" lever, the catch lever is weighted, so that when the person
" *seated rises*, the catch descends and imparts motion to the

" valve lever, but again releasing itself before it arrives at its " lowest position. The valve for the supply of the water is " placed in a small cylinder, having a horizontal partition, " through which the valve rod passes up to the lever before-" mentioned. The water-valve is placed in the bottom of this " small cylinder." "The water admitted and passing through " the lower part of the small cylinder by its pressure, raises a " small valve in the partition before-mentioned, and enters a " space between it and an inverted cup leather fixed to the valve " rod. The water thus entering prevents the descent of the " valve when the weighted lever falls, by reason of the water " having no other escape than by a small return passage through " the partition, which retards the closing of the valve more or " less, and causes it to shut slowly."

Another part of this invention consists in forming one side of the receiver that is underneath the pan of a spherical form, " which facilitates the escape of the soil, and renders it freer " than the passage afforded by the ordinary receivers."

[Printed, 1*s*. Drawings.]

A.D. 1857, December 21.—N° 3131.

TAYLOR, Francis.—" Improvements in closets or privies."

In place of the soil passing away by drains, in these closets it is dried by heat. A receptacle is employed into which the soil falls; on the top of it are two valves, "connected together at " right angles to each other, and these valves are connected to " the lid of the closet, so that one valve closes the receptacle " when the lid is open, and the other when the lid is closed. " Underneath the bottom of this receptacle there is a gas-burner " to dry the soil, or the receptacle may be heated by other means; " and at the top of the receptacle there is a pipe to convey away " the vapour. The valve which closes the receptacle when the " lid is shut, is rendered perfectly air-tight by the valve fitting " into a groove in which water or mercury is placed. "The re-" ceptacle can be removed from time to time and emptied, and " the contents may be employed in the manufacture of manure " or charcoal."

[Printed, 6*d*. Drawing.]

1858.

A.D. 1858, January 1.—N° 4.

GORLE, GEORGE.—(*Provisional protection only.*)—" A new or " improved service-box for waterclosets."

This invention " consists of a hollow cylinder, closed at top and " bottom, excepting the openings or valves," " and provided " with mechanism " " for operating upon the said valves. A " portion of the bottom of the service box is formed of india-" rubber, or other flexible material, upon which a weight in the " service box rests. The said weight is connected by a rod with a " valve on the top of the service box, the said valve opening and " closing the communication between the supply pipe and the " service box. A second valve is situated on the top of the " service box, the said second valve being connected with an air " vessel or float in the interior of the service box. In the bottom " of the service box is a valve, which opens and closes the com-" munication between the service box and the pan of the water-" closet. The last-mentioned valve is so connected with the weight " herein-before described, that on the said weight being raised the " said valve is closed." The apparatus is put into operation by means of pressure on the seat of the water closet.

[Printed, 4*d*. No Drawings.]

A.D. 1858, January 9.—N° 38.

BROWN, ROBERT.—(*Provisional protection only.*)—" Improve-" ments in water closets, parts of which are applicable to pumps."

This invention is principally applicable to ships' waterclosets. The discharge orifice at the bottom of the basin is oblique; its rear is provided with a slide valve which works in an oblique direction. The slide of the said valve is tapered, and slides upon two pieces of metal which are backed up with india-rubber which is held in grooves formed in the valve seat. The valve rod works through a stuffing box on the end of the valve box. An enclosed semicircular chamber is beneath the closet pan; to the inner side of the top of the said chamber a swinging valve frame is jointed, the valve clapper of which opens backwards; the discharge opening of this chamber is formed at the rear of the top and is protected by an outlet valve. "The water being supplied to the " closet pan by any of the ordinary methods, is discharged on

" opening the wedge-shaped slide valve on the throat of the pan " by the action of the swinging valve, which has a pendulous " motion communicated to it through a lever connected to its " axis."

A closet may be constructed by using only two of the above-mentioned valves, say, the swinging valve and the outlet valve, or the slide and pendulous valves. When the pumping power of the pendulous valve can be dispensed with, the closet pan may be discharged by gravitation only; "then a watercloset may be " formed with the wedge-shaped slide valve, and the protecting " outlet valve on the discharge orifice. But, in most cases for " ships' use it is preferred to use the whole three valves."

[Printed, 4*d*. No Drawings.]

A.D. 1858, February 11.—N° 256.

BELL, RICHARD.—" An improvement in stable pans, sinks, and " urinals."

A concave vessel is formed in or near the bottom of a sink or urinal with a plate descending therein, and having a space between the bottom edge of the plate and the bottom of the vessel for the passage of liquid. A pipe leads to a drain. When there is any liquid in the vessel, a sealed joint is formed. A plug is fitted to the cover of the pipe for the sake of access. Stable pans are formed in two compartments cast in one piece, and separated by a descending plate. There is a cover to each compartment.

[Printed, 6*d*. Drawings.]

A.D. 1858, March 5.—N° 442.

COMMON, NICHOLAS.—(*Provisional protection only.*)—" An " improved arrangement of water supply valve."

The object of this invention is to prevent water from escaping, except when the valve is being moved from one seat to another; it is applicable to prevent the waste of water in water closets. " For this purpose I provide in the outlet pipe an equilibrium " valve which commands a two-way inlet passage;" " and this " valve I actuate by means of a rock bar mounted on a fixed " fulcrum, and connected at one end with the valve rod, and at " the other with a link jointed to a fixed bearing. On the fulcrum " of this rock bar I mount loosely a tumbling lever." " Below " the valve is a plunger which fits into the closed bottom of the

" outlet pipe, and is pierced with a small hole to allow water to " flow beneath the plunger and escape upwards therefrom." " The handle for working the valve is connected with the pan " lever as usual, and to the lower end of the handle rod radius " levers are connected, this fixed fulcrum being the fulcrum of " the rock bar. Attached to the tumbling lever by a swivel pin " is a tumbling piece, against which the levers as they rise bear, " and thereby the radius levers alternately (as the handle is drawn " up) throw over the tumbling lever, which forces the valve in " contact with its upper or lower seat."

[Printed, 4*d*. No Drawings.]

A.D. 1858, March 30.—N° 674.

STEVEN, THOMAS, REID, THOMAS, and FREW, THOMAS.— " Improvements in making moulds for casting."

This invention "relates to improvements in making moulds " for casting, whereby various articles, such as pipes, columns, " pumps, gutters, the connections appertaining to the preceding " articles, cisterns, water-closet pans, sink traps, camp ovens, " three-legged pots, kettles, boilers, and similar cast-iron articles " can be manufactured more satisfactorily and economically than " by the ordinary processes hitherto in use."

In making moulds for pipes and similar articles, green sand cores can be used instead of stove dried cores. The green sand cores are rammed up through narrow openings, and their core bars are of increased strength, so as to dispense with "thickness " pegs;" the said core bar occupies portions of both halves of the core.

Portions of moulds for the insides of cisterns and similar articles are rammed up through contracted openings in the under frames or plates, or bottom portions of the mould boxes. The outer portions of the moulds are first rammed, the patterns being supported by skids or supports with their extreme or outer corner edges barely in contact with corner edges formed in the lower frames. The outer portion of the mould being rammed, the whole is turned over, the skids are removed, and sand is rammed into the inside of the pattern through the opening in the under frame. Sand partings are dispensed with in these cases.

The outer portions of moulds for pots and similar articles are formed in half mould boxes adjusted on opposite sides of a vertical plate to which the pattern is attached, one half being on each side of it. The cores for pots and similar articles are formed in core boxes divided vertically into two complete halves, the sand being rammed in through a plate fitted into the conical mouth of the core box, such plate retaining the core and serving as the bottom portion of the complete mould box.

Moulds for articles of sizes differing from those of the original patterns employed may be produced by the aid of layers of a flexible or plastic material, such as clay.

[Printed, 1s. Drawing.]

A.D. 1858, April 9.—N° 766.

SMITH, George.—(*Provisional protection only.*)—"Improve-" ments in the manufacture of close stools, night commodes, and "waterclosets."

This invention consists in rendering the above-mentioned articles nearly inodorous by placing a double framework of perforated zinc, wire gauze, or porous cloth, between which coarsely powdered vegetable or animal charcoal has been introduced at the sides, top, and bottoms of close stools, night commodes, and water closets.

[Printed, 4*d*. No Drawings.]

A.D. 1858, April 13.—N° 795.

JOPLING, Thomas Taylorson.—"Improvements in water-" closets."

A small supply cistern, with an ordinary ball cock, contains the measure of water to be used at each action of the closet. The water escapes from the cistern by a weighted outlet valve. The stem of the ball cock and the outlet valve are connected together by a chain, which passes over a pulley mounted at the end of the lever which is acted upon by the hinged seat of the water closet. A counterpoise, in connection with the lever which carries the pulley, keeps the pulley constantly in its highest position. The depression of the seat lifts this counterpoise, and allows the outlet valve of the cistern to close and the inlet valve to open, the cistern consequently fills with water; when the seat rises, the lever returns to its former position, and the water is discharged into the pan. The lever of the pan valve is attached to a rod which carries a float placed in the supply cistern; when the cistern is empty the weight of the float keeps the pan valve closed, but when water enters the cistern, the float has a tendency to rise with the water and to open the pan. "To prevent this " action from taking place too soon, the movement of the seat " caused by the weight of the person using the seat, and which " movement admits the water to the cistern," "also locks the " valve of the pan so that it cannot open till the seat again rises, " but then it immediately opens, and remains open while the " greater part of the water runs out of the pan."

In one modification of this invention, a lever is connected directly with the outlet valve and acts, by its other end, upon the ball cock; the outlet pipe rises and falls through a stuffing box. In another arrangement two levers are used, one to each valve.

[Printed, 10*d*. Drawing.]

A.D. 1858, May 7.—N° 1023.

DUVARD, James Michael.—"An improved bedroom vase."

"My said invention consists of an improved bedroom vase or " utensil, constructed with an upper and lower chamber fitting " closely into each other, and made of any suitable size and " material.

" The upper chamber is funnel-shaped, and pierced with a " hole leading with or without a pipe to the lower chamber, so as " to convey to it the liquids or contents deposited in the upper " chamber.

"I place in the upper chamber a ball of glass, metal, caoutchouc, or other material or compound of the same, having a " cord or other suitable contrivance passing through a hole to " the exterior; and to prevent any effluvia escaping through the " said hole, I put one or more knotts to the cord, which effectually " stops the orifice.

" The said ball acts as a valve, falling by its own gravity into " the hole of the upper chamber, thereby preventing any effluvia " or unpleasantness arising from the contents of the lower " chamber of the vase."

[Printed, 10*d*. Drawing.]

1858, May 22.—N° 1145.

UNDERHAY, Frederick George, and CLARK, Josiah Latimer.—" Improvements in cocks or taps, and in apparatus " *for flushing.*"

In constructing ball and other cocks, "means are provided "for the passage of water from the face of the valve, which closes "the water-way or passage to the back of another valve or piston, "so as to produce more or less complete an equilibrium in regard "to the pressure of the water." In one arrangement a cupped leather, and in another a flexible diaphragm, is used as a piston. The peculiarity of these cocks consists in the use of a valve with a hollow stem, combined with a piston, a lever or handle, and a suitable body or barrel.

According to one method of flushing water closets, urinals, and other places, a constant supply of water flows into a cistern until it has arrived at such a height as to raise a float and an outlet valve in connection therewith. One plan of carrying out this method practically, consists in having a conical float attached to the counterbalanced outlet valve by means of a chain; in this case, the float first rests on its side, and then assumes a vertical position; the valve, being attached to an axis, is moved away from its seat during the rush of water. In another plan two floats are used, one supports the valve and spindle, the other is chained to the first and lifts the valve, which is guarded by a fixed bar. In a third arrangement, the float works in vertical guides, and is only released by a curved surface on the axis of the ball cock, when the lever of the said ball cock is in a horizontal position.

Another apparatus for flushing consists of a cistern mounted on axes, having a constant supply of water into one at a time of its two compartments. Each compartment has an outlet valve attached to a chain which hangs from a fixed point. When a compartment becomes filled, it inclines over against a stop, its valve is opened, and the water in it flows away; at the same time the other compartment is brought underneath the supply pipe.

[Printed, 1*s.* 2*d.* Drawings.]

A.D. 1858, June 3.—N° 1245.

OWEN, ROBERT.—"Improvements in water-closets, night com"modes, or similar conveniences, and also in disinfecting pro"cesses."

According to this invention, certain boxes, drawers, or receptacles, with double perforated bottoms, are charged with any disinfecting agent. Backward and forward sliding motion is communicated to the said boxes by the movement of the cover of the seat of the water closet, through levers, chains, and pulleys. "The powder boxes are placed either in the interior of the closet "or commode or in the lid or cover."

These closets have a back tank for the solid excrements, and a front tank or urinal. Fixed at a suitable height in the urinal is a tap, consisting of two hollow tubes, one working inside the other; transverse holes in the tubes permit of the exit of the urine when the plug tube is suitably placed to the outer tube. The joint of the cover of the commode consists of two pivots fixed to the case; each pivot is placed within the apex of the handle, so that the levers connected to the cover, and which actuate the powder boxes, shall only be raised to the under side of the seat, upon which the cover rests in the usual manner. The urine may be treated a second time with powder in an overflow vessel, from which the disinfected urine may be lifted by an extractor.

An apparatus for disinfecting common privies consists of a box to be hinged on to the seat, and acts by means of a lever, cord, catch, and ratchet wheel, in combination with bevil gear, to shake the powder through the aperture in the seat.

In a night commode, the machinery may be acted upon by the opening or shutting of a door.

The boxes may be used to disinfect public urinals, the depression of a footboard pulling a wire and letting fall the powder.

Liquid disinfectors may be used, and a hand box may be employed.

A stove with trays may be used to dry the disinfected manure, employing ventilators filled with bags of disinfecting material to retain the valuable properties of the manure whilst being dried.

[Printed, 1*s*. Drawing.]

A.D. 1858, June 21.—N° 1399.

THRIFT, WILLIAM, and HIGH, ADAM.—(*Provisional protection only.*)—"Improvements in house water-closets."

One of the levers "is placed in connection with the seat "of the closet, the other with the arm on the axis of the "tumbling pan or valve, and also with the valve to admit the "supply of water. These levers are placed in such relation to "each other that a catch suspended to the end of the first lever "(that connected with the seat) when the seat is depressed and

“ the catch raised) swings over a stop formed on the pan lever. “ The catch lever is weighted, so that when the sitter rises, the “ lever and catch descend, and impart motion to the valve or pan “ lever, but again slipping off & releasing itself before it arrives “ at its lowest position. The valve for the supply of the water “ is placed in a small cylinder or vessel having a horizontal “ partition, through which the valve rod passes up to the lever “ before mentioned. The water valve is placed in the bottom of “ this small cylinder, and when opened admits the water, which “ passes from thence by another pipe, and enters the fan or spread “ of the closet. The water admitted and passing through the “ lower part of the small cylinder by its pressure raises a small “ valve in the partition before mentioned, and enters a space be“tween it and an inverted cup leather fixed to the valve rod. “ The water thus entering prevents the descent of the valve when “ the weighted lever falls by reason of the water having no other “ escape than by a small return passage through the partition, “ which retards the closing of the valve more or less, and causes “ it to shut slowly.”

[Printed, 4*d.* No Drawings.]

A.D. 1858, June 22.—N° 1413.

ROBERTSON, JAMES.—(*A communication.*)—(*Provisional protection only.*)—“Improvements in apparatus for regulating the “ flow or passage of fluids.”

This invention relates to valvular apparatus for supplying water closets and other vessels with a regulated flow of water. The apparatus consists of a cylindrical chamber closed top and bottom. The supply from the main enters the bottom end, which is hollow. “In the centre of this end disc or shell there is an “ aperture communicating with the inlet section of the main “ pipe, while there is a second aperture slightly eccentrically dis“posed, and communicating with the opposite or outflow section “ of the main pipe leading to the closet pan, the apertures being, “ of course, completely separated by a sectional portion of metal “ cast in for the purpose. Upon this perforated disc shell face “ there is fitted a circular disc of caoutchouc or other flexible “ material, arranged to bear upon an external annular face all “ round the shell. This flexible disc has screwed upon each face “ a button or small disc piece of metal, the under one of these “ small discs having fitted to it a soft or flexible face piece of

" leather," "to form a valvular fit upon an elevated annular " working face round the central hole in the shell. The central " or barrel portion of the operating chamber has attached to it a " lateral water pipe of narrow bore, and fitted with a stop-cock " for setting the flow. The top cover or end disc of the chamber " has passed through its centre a vertical spindle, fitted with a " helical spring to keep it up. The lower end of this spindle, " which is passed through the cover, has upon it a holding collar " or button, to carry a second large flexible disc of caoutchouc, " which" "is of the same diameter as the cylinder's bore. The " upper cover is dished on its inner face, for the elastic disc to " settle into and leave more space beneath." Pressure upon the seat of the closet puts the apparatus into action.

Various forms of the apparatus are described.

[Printed, 4*d*. No Drawings.]

A.D. 1858, June 24.—N° 1427.

ROBINSON, JOSEPH.—(*Provisional protection only.*)—" Im" provements in applying and adapting waterclosets to ships, so " as to ensure the safety and more perfect ventilation of the " same."

"The pipe from each closet is connected to a main sewer pipe, " connected to a powerful exhausting pump, worked either by " hand, steam power, or other suitable means, so as always to " maintain a partial exhaustion of the sewer pipe or pipes, and " thereby cleanse the closets, ventilate the ship, and insure its " safety, from the fact of there being but one outlet for any number " of water-closets."

[Printed, 4*d*. No Drawings.]

A.D. 1858, July 3.—N° 1500.

JENNINGS, JOSIAH GEORGE, and **CULPIN**, THOMAS.— " Improvements in apparatus for measuring, regulating, and " preventing waste when supplying fluids."

An apparatus for supplying water to water closets is set forth as one part of this invention. A lever, working through a diaphragm in a valve box, actuates a valve that admits water from the supply pipe. The time during which the valve is to remain open is regulated by means of a weighted bucket which is operated by the tail of the said lever. When the valve is opened, a certain amount of water flows into the cylinder in which the bucket works, and until this water has escaped by means of a small passage, the valve remains open, and the supply of water to the closet is continued. The valve has a piston mounted on its end which works in a cylinder. A central wire projects into the cylinder and passes loosely through the axis of the valve, thus keeping clear and free from stoppage the central passage through the valve and enabling the pressure to be equalized on each side of the valve, by means of the fluid pressure on the piston. The lever is actuated by the handle of the closet.

Water meters, water supply regulators, and bath valves are set forth in this Specification.

[Printed, 3*s.* 4*d.* Drawings.]

A.D. 1858, July 3.—N° 1504.

JENNINGS, Josiah George, and LOVEGROVE, James.—"Improvements in waterclosets, and in apparatus used in "ventilating house drains or sewers."

"In constructing stone or earthenware basins for waterclosets, "the basin is formed with a conical outlet in the side or bottom, "in which is fitted a hollow plug of metal or other material, "which is made water-tight by a flexible ring. This hollow plug "is of such a length as to retain the water in the basin to a "proper level, and any addition of water flows off through the "hollow plug, it forming an overflow pipe as well as a plug. "The plug is fitted with an ordinary closet handle, and when "lifted liberates the contents of the pan into the ordinary syphon "trap. At other times the plug is to remain in position during "any determined time, the object being to save water from sinks, "waste pipes, or other sources where the supply of water may be "limited."

In order again to fill the basin with water after it has been emptied, a valve is employed of a construction similar to those described in No. 1500 of the year 1858. A float is in connection with the valve lever and so governs the valve. A small ball is kept off its seat when the float is at its highest position, and thus enables the supply water to proceed to the top of the valve and to keep it closed. When the float falls, the small ball closes the tube, the chamber above the valve is opened, and the water escapes therefrom. The valve then rises and the water passes into the basin.

"In order to ventilate house drains and sewers, we combine an
" air valve with the ordinary syphon trap and outlet valve, the
" valve being metal faced, the agent or motive power of ventila-
" tion being the variation in the temperature of the atmosphere,
" and the water discharged into and flowing through the drains
" or sewers."

[Printed, 1s. 6d. Drawings.]

A.D. 1858, July 14.—Nº 1583.

CHAPUSOT, François, and AVRIL, Victor. — (*Provisional protection only.*)—" Improvements in producing a more or less " perfect vacuum, and applying the same to industrial purposes."

A Torricellian vacuum is made in a large chamber, by filling the same with water or other suitable liquid, then drawing off this liquid through an outlet pipe of suitable altitude having a stop-cock for that purpose. The vacuum thus produced may be applied at once to the employing of privies, cesspools, and sewers for instance.

"The barometric vessel we prefer is made from sheet iron with
" cast-iron top and bottom; the stop-cock is constructed in such
" manner as to allow of a very gradual opening of the pipe, and
" we use an articulated hose for putting the vessel in communi-
" cation with the matter to be acted upon by the vacuum, so
" that the entire operation consists in filling the barometric vessel
" with water or any other suitable liquid, open the stop-cock in
" order to let the liquid run out of the vessel, turn the cock, and
" close the vessel, in order to retain the vacuum thus formed in
" the vessel; and finally, bring this latter, by means of the hose,
" in direct communication with the liquid matter to be acted
" upon, or with any other vessel in which a vacuum is wished to
" be obtained."

[Printed, 4d. No Drawings.]

A.D. 1858, July 20.—Nº 1639.

BROOMAN, Richard Archibald.—(*A communication from G. M. Legé.*)—(*Provisional protection only.*)—" Improvements in " movable apparatuses for receiving fecal and sewage matters."

By means of this invention "the solid matters are retained,
" while the liquid portions only are allowed to flow into the drains
" and sewers.

"The apparatuses consist of a cask or vessel, in the side of which "is a screw plug or stopper, protected on the inside of the vessel "with a rose wire gauze or perforated plate; a cover is luted or "cemented on to the vessel; an outflow pipe is caused to enter "the side of the cover and to extend down into the vessel for "a short distance, where it terminates in a rose or box formed "of perforated plate or wire gauze. When placed for use the "vessel is filled with water sufficiently to enable the outflow pipe "to act; then upon any solid or liquid matters entering through "the inlet pipe, liquid will flow through the rose and outflow "pipe into a drain, sewer, or other outlet, while the solid matters "will be retained either upon the surface of the liquid in the "vessel or upon the bottom of the vessel. The apparatus will "continue to work until the rose or perforated box becomes "clogged by the solid matters. The screw stopper must next "be removed from the side of the vessel, when the liquid contents will run out into a drain or otherwise, leaving only solid "matters in the vessel.

"The apparatus has to be removed to be emptied of its solid "contents, and another similar apparatus put down to supply its "place."

[Printed, 4*d*. No Drawings.]

A.D. 1858, July 26.—N° 1678.

HARDIE, JOHN.—"Improvements in apparatus for regulating "the flow or passage of fluids."

"Under one form of parts as applied to watercloset purposes, "the apparatus takes the form of a solid duplex metal shell, "having a lateral inlet and outlet branch, one on each side." "This valve case or shell is screwed down upon a metal base "plate, and it has within it an upper and a lower valve face, "fitted with corresponding upper and lower inverted circular disc "valves" "fast on one vertical spindle, which projects upwards "and passes into an upper recess in the shell, its extreme end "being fitted with a small ball weight or guide piece. The lower "valve is attached to the centre of an elastic or flexible diaphragm "secured water-tight all round its periphery and the bottom end "of the shell, a cavity or small chamber being left beneath this "flexible division piece. The water inlet branch opens into that "section of the shell containing the two valves, and between the "valves, whilst the outlet branch leading to the closet pan

" similarly opens into the other section of the shell. The inlet " branch also has a small passage governed by an adjustable " stop-cock leading into the space in the bottom of the shell " beneath the flexible diaphragm. When the closet is put to use " the water supply, as induced in the usual manner, flows into " the shell between the two disc valves, and the bottom one " being the largest in area, it follows that the two valves with " their spindle are depressed, and thus the water escapes past each " valve into the other section of the shell, and thence away to " the pan or basin." A minute flow of water through the adjustable passage now enters beneath the flexible diaghragm, and causes the valves gradually to rise to their seats and stop the supply.

[Printed, 8*d*. Drawing.]

A.D. 1858, July 26.—N° 1683.

JONES, Edward.—"Effecting a better system of drainage, and " the machinery and apparatus necessary for the same, whereby " the sewage manure is collected and conveniently exported for " use, and the noxious effluvia prevented from contaminating the " air of populous cities and towns, and whereby the drains may " be more strongly and securely built by the manufacture of a " more suitable and better material."

The portions of this invention which immediately refer to the present series, are :—

A drain trap, which is applicable to the purposes of sinks, areas, &c., requires no brick cesspool, but it is fixed upon the socket pipe, "being cast entire with a movable tank and dip " plate, either fixed or movable, other parts being equally " adjusted."

A water closet pan and trap has flexible joints, with the pan and with the soil pipe respectively, so as to allow the pipe end of the trap to descend sufficiently low to empty its contents. The flexible joints are made of any waterproof air-tight material properly secured to the respective parts, "so as to prevent the " least smell escaping." The handle of the water closet works a lever by means of which the trap is made to descend ; the said handle also acts upon the star points of the supply valve or cock.

"It will be seen that this kind of improved movable trap " and pan are capable of being adapted to any kind of portable

" watercloset, or night commode, or invalid chair, by simply " fixing underneath a vessel to slide in air-tite grooves, the " same being so adapted with a lid to slide over it, while in the " act of being withdrawn."

[Printed, 1*s.* 10*d.* Drawings.]

A.D. 1858, September 8.—N° 2037.

PETERS, Alexander McEwan.—" Improvements in appa-" ratus for regulating the flow or passage of fluids."

" Under one modification the apparatus as applied to water-" closets takes the form of a duplex valvular chamber or shell " in three sections." The lower section communicates with the supply pipe, the intermediate section with an air vessel or elevated reservoir, and the upper section with the basin. The drawings do not show an air vessel, but simply a spindle valve with two discs, the vertical spindle working through a stuffing box. When the spindle is at each extremity of its motion, the flow of water is shut off. A lever connects the hinged water closet seat with the valve. " The pan or bottom discharge valve " of the basin is balanced upon a horizontal spindle or centre " fitted with an equipose weight, so that when the water has " flowed into the basin it tips over to discharge it, and the " counterweight brings it back again to its position for use."

" In adapting the improvements to urinals, a part of the flooring " near the basin is caused to oscillate slightly upon its support-" ing spindles, or to descend, in order to open the valvular " apparatus and cause the water to flow, so long as the actuating " board is kept down."

In one modification of the water closet arrangement shown in the drawings, a piston and cylinder, connected with the water supply pipe, acts, by pressure of water, to keep the pan in a horizontal position charged with a certain quantity of water. The flowing of the water into the pan on the rising of the seat opens the pan valve.

In another modification, the vertical spindle of one valve works the hinged plate of the other.

The whole of the valvular and other operating details of a water closet may be " carried by an independently main closet " structure."

[Printed, 1*s.* Drawing.]

A.D. 1858, October 12.—Nº 2272.

JOHNSTON, WILLIAM, and ROSS, WILLIAM.—"Improve-
" ments in waterclosets and taps or valves."

The valve mechanism of water closets consists of a boss fast on the end of the pan spindle, which has two catch notches. There is a third catch notch on the counterweight of the pan. A catch or pall lying in one of these notches (the notches on the boss) holds the pan valve shut when the water closet is not in use. The catch projection or notch on the counterweight prevents the pan from closing until a catch lever is disengaged by means of a "pan regulator." The pan regulator is a small vessel containing a float.

It is preferred to govern the water supply for flushing the basin by a modification of the apparatus described in No. 863 of the year 1857.

The "cast-iron trunk of the closet" is so shaped "that its
" lower part contains the effluvia trap or water valve, instead of
" this being provided for in a separate piece."

In a disc valve, the valve piece is closed by the pressure of the fluid. The valve piece is connected by a spindle to a cup-shaped diaphragm of vulcanised caoutchouc, fixed over an opening in the shell of the valve. In another arrangement the fluid enters between the valve piece and the cupped diaphragm, the former closing against the fluid pressure on its surface, this pressure, however, being overbalanced by the contrary pressure on the cupped diaphragm; in either of these instances the valve is opened by pressing the diaphragm inwards. In another instance the valve piece is closed against the fluid pressure by depressing the diaphragm. The first two arrangements may be made to occupy a determinate time in closing.

Certain improvements in valves for controlling the exit of the water lodged by condensation in steam pipes are set forth.

[Printed, 1*s*. Drawings.]

A.D. 1858, December 2.—Nº 2754.

MAC KIRDY, LANCHLAN.—"Improved combined bathing,
" washing, and water-closet apparatus."

"This apparatus comprises, first, a vessel answering as a foot,
" body, or sitting bath, and occupying the lowest part of the
" *apparatus;* secondly, a plunge or washing basin placed upon

" or within a stand, contrived to answer also as a seat when the " lower vessel is used as a foot bath; thirdly, a shower-bath " discharger placed directly above the plunge basin; and, fourthly " a watercloset ordinarily concealed within the stand and con- " trived so that the act of drawing it out for use places it in com- " munication with the discharge passage, which is at other times " closed."

One of the tubes that supports the canopy of the apparatus serves also as a water pipe, and it may either be supplied from the main or from an overhead cistern. There are branches from the said tube that supply each apparatus with water. The branch that supplies the water closet is provided with a tap and with a length of caoutchouc tubing to allow of the movement of the water closet. The trap bend of the water closet communicates with the discharge pipe by means of a kind of tap joint. When the water closet is pushed into the stand, it turns about the tap joint, and closes the communication, the reverse act of drawing out the water closet opening it.

In this invention, bathing, washing, and water closet apparatus are combined in one piece of furniture.

[Printed, 8*d*. Drawing.]

1859.

A.D. 1859, January 29.—N° 267.

MARINO, Joseph.—" An inodorous closet or commode."

In this closet the liquid and solid excrement are separated and retained for service as manure.

The closet consists "of a box fitted with a lid that shuts down " upon an open seat. Under this seat is placed a pan or other " detached vessel for receiving the solid excrement, and a little " in advance of this is an open funnel for receiving the urine " and conducting it away to another vessel."

In a closet to be placed out of doors, a conical case contains a conical soil pan, and has a seat and hinged cover. At the upper edge, on the inside of the case, the funnel for receiving the urine is placed; its spout is inserted in a curved pipe which leads down to the urinal under the foot step. The urinal has a funnel-shaped cover. A draught pipe, fitted to the upper part of the case, has an oil lamp or gas burner placed in its aperture to facilitate the escape of the foul air.

In the bed-room closet, an upper compartment receives the pan, and a lower one the urinal.

In the simplest construction, the outer case forms the urinal and encloses the soil pan. A support for the back and arms of an invalid may be fitted to a commode. The funnel for the urine may be fastened to the outer case by hooks.

When there are closets on each floor, they are placed "above "each other, so that each one in the series will communicate with "one common pipe or conduit, the conduit widening for each "floor so as to allow the soil to fall with facility into a common "reservoir at the basement of the building." A general urine pipe conducts the urine from each closet to a general urinal at the basement. Behind the closets, on each floor, there is a pipe leading to a general draught pipe.

[Printed, 1*s*. Drawings.]

A.D. 1859, February 18.—N° 455.

CLARK, William.—(*A communication from Pierre Téhophile Joly, junior.*) — (*Provisional protection only.*) — "Improvements "in emptying cesspools, and in raising other fluid & semi-fluid "matters."

"This invention consists in an improved method of effecting "on known principles the emptying or raising liquid & thick or "muddy matters, by means of a vacium obtained in a vessel "or capacity. I apply this improved method especially for "emptying liquids for irrigation, or for exhausting liquid or "muddy matters. For emptying fecal or other matters, I pro- "ceed as follows:—I inject steam produced in any suitable "generator into a metallic capacity, which by means of valves "or stop-cocks may be perfectly closed; the steam so injected "drives the air from the capacity, & the steam then fills the "chamber. When the chamber is so filled with steam, all the "valves and cocks are shut; the steam thus enclosed condenses "and produces a vacuim, and the vacuum chamber being placed "by means of suitable tubes in connection with the space from "whence the liquid or muddy matters are to be drawn, the said "matters are thereby raised and enter the chamber or capacity. "Thus, by any suitable generator in a central establishment,

" barrels may have a vacuim produced in them, & be afterwards " removed and placed in connection with the matters to be " emptied by means of tubes plunging into the liquid or muddy " matter contained in the cesspool, which they will draw up. " The condensation of the steam may take place during the " transit of the vessel. This improved method of raising liquids " may be applied for the purposes of irrigation, & raising other " fluid or semifluid matters. I make no claim to any particular " apparatus for the purpose.

[Printed, *4d.* No Drawings.]

A.D. 1859, March 14.—N° 642.

TYLOR, ALFRED.—" Improvements in apparatus for regulating " the supply of water to waterclosets and other vessels."

" The supply pipe is connected to the one end of the top of a " chamber, in the bottom of which chamber there is a cylinder " in which a piston works; to the other end of the top of the " chamber a pipe is connected, and it passes to the pan of the " closet or other vessel. The end of the supply pipe is closed by " a valve which is attached to the end of one arm of a lever; the " other arm of this lever is by preference of a curved form, and " passes through a slot in the piston rod of the piston which " works in the cylinder below. Through the piston there are a " number of holes, and to the centre of the bottom of the piston " a disc of india-rubber is attached, which, when the piston is " moved downwards, prevents the passage of water through the " holes; but when the piston is moved upwards, permits the " water to flow through freely. From the bottom of the cylinder " a small pipe passes into the chamber above, and on this pipe " there is a cock to regulate the speed at which water may flow " through the pipe. The piston rod or the piston passes through " a stuffing box in the top of the chamber, and is attached to the " weighted lever, to which the handle is ordinarily attached. By " these means when the handle is lifted the piston will be moved " towards the top of the cylinder, and the valve will be moved " away from the end of the supply pipe; the water will then flow " through the chamber into the pan or other vessel until the " piston is again forced down, when the valve will be again " forced against the end of the supply pipe and the supply of " water stopped."

[Printed, *10d. Drawing.*]

A.D. 1859, March 14.—N° 648.

DAWES, John Samuel.—"A new or improved method or "combination of arrangements for the better securing and collecting of night soil or town manure, and rendering it more "valuable for agricultural purposes."

The said method consists in "constructing the privy buildings "in two compartments under one roof, and at a greater elevation "by a few feet than hitherto, so that all the refuse deposited "therein may be collected in a box or carriage on low wheels." The said box, when full, can be removed without nuisance by having a close fitting lid temporarily placed over it; "and as the "situation of these receptacles should in all cases where possible "be fixed at a somewhat higher level than the street, they may "be drawn away with great facility by the scavengers, and placed "upon a low-bodied cart or waggon made for the purpose of "receiving them. The boxes may thus be conveyed to a convenient depôt outside the town, a due supply of empty manure "chests being provided."

A further improvement "consists in having a large iron or "strong wire screen similar to those used for screening coal "slack placed at a high angle above the manure box, so that on "the ashes from the house fires being thrown upon it, all the "fine alkaline particles will pass through together with as much "of the small cinders or coke as will absorb the whole of the "offensive gases, thus adding to the quantity and usefulness of "the manure. The large cinders pass off at the other side of the "screen to be reburned."

The drawings show an arrangement in which a steeply inclined channel connects the seat of the privy with the above-mentioned box. There are steps up to the privy building, under which is an archway closed at one end for the reception of rubbish. The "urinals" are daily emptied into the box through a small doorway.

[Printed, 6*d*. Drawing.]

A.D. 1859, April 5.—N° 853.

CHANTRELL, George Frederic, and DUTCH, Edward.—"Improvements in the apparatus for regulating the quantity of "*water to be* used for the flushing of waterclosets, and other "*purposes.*"

This invention consists in certain self-acting arrangements for the above-mentioned purposes.

A supply cistern is provided with a double bottom, which forms a measuring chamber to contain the quantity of water required at each operation of the apparatus. The said cistern is constructed of stoneware and may be cylindrical, having an internal annular flange, against which abuts the upper and lower slate bottoms. A double-acting valve, in the measuring chamber, is used to cut off the supply to the measuring chamber, and at the same time to open the discharge orifice, or, upon the action being reversed, to open the supply valve and close the discharge orifice. The seat of the closet, or a platform in front of the closet or urinal, brings these valves suitably into action by means of connecting rods and a lever at the top of the cistern. When the supply cistern is fed from a high-pressure main, the feed pipe is provided with an internal valve which opens upwards; the shank of the valve is attached to one end of a lever which carries a float at its other end, the rising of the water thus closes the valve. An air pipe extends from the top of the supply cistern into the measuring chamber; this pipe may also act as an overflow pipe. In one instance, the double-acting valve has two faces, an upper one pressing against the bottom of the cistern, and a lower one which may be pressed against the outlet passage. In another case, two valves on the same rod serve the same purpose. In a third case, the upper valve is in the cistern and the lower valve is in an enlarged part of the outlet pipe.

[Printed, 8*d*. Drawing.]

A.D. 1859, May 27.—N° 1313.

AITCHISON, Patrick, and BINKS, Thomas.—"Improvements in self-acting and other waterclosets, and in flushing apparatus connected therewith."

"The neck or outlet of the basin is projected towards either the front or back, in such manner that the centre of the outlet is overhung by the re-entrant angle or rim formed at the junction of the neck with the front or back of the basin." "The flushing apparatus consists of a service box in connection with a cistern, a flushing pipe, and a discharging vessel. In the top of the service box is fixed the inlet valve, and in the top of the discharging vessel the outlet valve; the flushing pipe, which

" is perfectly vertical, connects both. The inlet is closed by a " weight downwards and the outlet by pressure outwards. The " outlet valve is provided with a diaphragm of vulcanized india-" rubber or other material on each face, that on the top face large, " to act on the valve seat, but that on the lower seat small, to " close on a tube projecting upwards from the bottom of the " discharging vessel; projecting downward from the outlet valve " and passing through this tube is a lifting rod, to be acted upon " from below. From the top of the outlet valve and the under " side of the inlet valve, similar rods or guides also project and " fit into the opposite ends of a small tube placed between both " valves; the length of this tube determines the relative position " of the valves, and is so regulated that when the outlet valve is " closed, it raises and opens the inlet, to admit water into the " service box and flushing pipe, and when the inlet valve closes, " it depresses and opens the outlet, and admits the water con-" tained in the service box and flushing pipe to flow through the " discharging vessel into the basin."

[Printed, 10*d*. Drawing.]

A.D. 1859, June 4.—Nº 1374.

CHRIMES, Richard.—"Improvements in apparatus for sup-" plying water to and discharging the contents from urinals, " washhand basins, and other similar articles."

"As applied to urinals, it is proposed to adapt a cock beneath " the urinal, the plug of which being turned to one point enables " a supply of fresh water to enter the urinal through the bottom " thereof, for the purpose of flushing and cleaning the same; by " a further turn, a very small or dribbling aperture is opened, " which allows a small quantity of fresh water to be constantly " flowing through the urinal from the bottom to the surface, " thereby diluting the urine, and keeping the water in the vessel " free from smell. This dribbling aperture may be varied in size, " or in place of one opening, a series of them may be used of " varying size, according to the requirements. A still further " turn of the plug enables the whole of the contents to be rapidly " discharged through the bottom."

" As applied to wash-hand basins," "the small dribbling aper-" ture or series of apertures may be dispensed with if desired, " *the only openings* in the plug in that case, being the discharge aperture for the waste, and the inlet aperture for the supply of "fresh water."

[Printed, 10*d*. Drawing.]

A.D. 1859, July 29.—N° 1757.

CULPIN, THOMAS.—(*Provisional protection only.*)—"Improvements in waterclosets, water cisterns, urinals, baths, lavatories, "and other sanitary apparatus, and in the mode of supplying "water thereto."

One part of this invention consists in making a water closet trap movable. "I make a trap of suitable rigid material bent "nearly to the form of the letter **S**; I connect one end of this "trap to the closet basin by a short flexible tube, forming a kind "of hinge; I connect the other end of the trap to the soil pipe "by a piece of corrugated tube of flexible material. The being "thus connected, the end furthest from the basin is held in an "elevated position by a weighted lever; this weighted lever is "controlled by the handle of the closet. The handle being lifted "the trap descends, and the contents of the basin are discharged."

The water supply valve is thus constructed. Through the spindle of a valve is passed a screw "which form a guide, for the "motion of the valve admits the water upon the opposite side of "the valve." "At right angles to this screw I have a second "spindle grooved parallel with its axis. These grooves correspond with a series of rings turned upon the valve spindle. "The valve spindle forms a rack and the other spindle forms a "pinion, to which the power is applied for moving the valve."

"A third part of my invention consists in making sanitary "vessels part of rigid and part of flexible material." The closet pan is made "of earthenware, except the bottom, which "being made of suitable flexible material will contain a quantity "of water, as a bag; a slight force being applied to the under "side, the contents are discharged through an opening or "openings provided for the purpose." In closets of superior quality, a floating valve is used in conjunction with a movable trap; "the water supply valve is for some purposes worked by a "compound lever, and for other purposes the force is made to "act direct upon the valve without the intervention of any "lever."

"Another modification of the water supply valve is that it is "self closing."

[*Printed, 4d.* No Drawings.]

A.D. 1859, August 3.—Nº 1788.

HEWETT, John.—" Improvements in self-acting water-closets."

According to these improvements, two levers are operated by the seat, and they act upon the ends of a rigid cross bar; "this " bar acts upon the lever, crank or piston connected with the " flushing apparatus." This arrangement is applicable to water closets constructed according to No. 1722 of the year 1857, in which a valve-box is used that contains a tongue piece, the raising of which closes the inlet pipe, and the depression of which closes the outlet pipe.

A modification of the construction of the valve-box is also a portion of this invention. The arm of the tongue or outlet valve is prolonged, and the end thereof bears a cup into which the rod of the inlet valve fits. The length of the rod of the inlet valve is determined by the length of the valve arm and the depth of the valve box, " in order that when the outlet is closed, the inlet may " be open."

" The arm of the outlet is fixed on a pivot at any convenient " distance from the outlet and the inlet pipes; the pivot projets " through the side of the valve box, and to it is affixed an arm " or lever, which is acted upon by the cross bar herein-before " referred to in such manner that when the front of the closet " seat is depressed, the cross bar being pressed upward by the " levers, raises the cup end of the arm of the outlet valve, which " in its turn lifts the inlet valve from its seat to admit water into " the valve box; the same motion closes the outlet valve. On " the removal of external pressure from the closet the inlet valve " falls on its seat and the outlet valve opens, the water then flows " into and flushes the basin."

[Printed, 10*d*. Drawing.]

A.D. 1859, August 4.—Nº 1797.

LISTER, Thomas.—(*Provisional protection only.*)—" An im- " proved sanatory water-closet."

The object of this invention " is to convert common privies " into water-closets."

" In carrying out my invention, I place the closet in such a " situation as to admit all the surface water or waste water made " upon the premises being conveyed to the vault of the closet. " The channel which conducts the waste water to the closet is " trapped when the water enters the vault. A trap and valve or

" plug is also provided, by which the night soil is let off from " the vault into a pipe communicating with the street sewer. " Two or three times per week, or oftener, as the case may re- " quire, this plug is lifted up, and the vault emptied. A trap " is formed with the plug, by which all foul air or gases are " prevented from entering the closet from the sewer. The " bottom of the vault may be inclined towards the plug and " trap to facilitate the discharge of the soil, and, if desired, an " additional exit opening may be provided in the vault to admit " of the latter being flushed and thoroughly cleaned when re- " quired. The vault may made of brickwork in cement or " earthenware, the latter being preferable. A covered aperture " is provided over the plug, through which the plug may be " raised by the hand when required. The earthenware vault " can, however, be used without the plug if required, the con- " nection between the vault and sewer being properly trapped, " and so arranged as to admit of liquid drainings running off " through a syphon. It will be understood, that by the water in " the vault rising it forms a trap by means of this syphon, and " all surplus water then passes off through the syphon or through " the hollow of the plug into the sewer when the plug is used in " combination with the vault."

[Printed, 4*d*. No Drawings.]

A.D. 1859, August 5.—N° 1806.

MENNONS, Marc Antoine François.—(*A communication from Irénée Leys.*)—" A system of columns or monuments to be " employed as sentry boxes, branch post and other offices, tele- " graph and fire-engine stations."

" The main object of the present system is to render uniform " in outward appearance, and to centralise as far as practicable, " these different structures by multiplying the applications of " each, thus economising to a considerable extent the street space " at present needlessly occupied."

The drawings show a column having a central pipe or chimney, which will act as a ventilating shaft in summer and as a means of carrying off the smoke of a fire in winter. The interior is lighted at night by a reflecting lamp placed centrally over a transparent cupola. Above the cap of the chimney is a weather cock. In the ground plan of one of these columns is shown a urinal having an entrance from the outside; the urinal may be hidden by an upright screen. The seats of a water closet for public use are also shown.

[Printed, 8*d*. Drawings.]

A.D. 1859, October 7.—Nº 2288.

DIXON, John.—(*Provisional protection only.*)—" Improvements " in apparatus for supplying water to waterclosets."

The closet is supplied from a cistern which contains the quantity of water requisite for the purpose. A pipe leads from this cistern, and from the lower end of this pipe a branch runs to the closet pan. " Through the pipe leading from the cistern a rod passes, " and the lower end of the pipe is closed by a disc, the centre of " which is connected to the rod; passing up the pipe to the top " of the rod a valve seat is connected; the exterior of the valve " seat is connected to the centre of a flexible ring, the periphery of " which is held between the bottom of cistern and the top of the " pipe leading therefrom, so that no water can pass down the " pipe except through passages formed in the valve seat." The rod is connected with the seat of the closet so that pressure on the seat suffices to cause the apparatus to act. When the seat is depressed, the passages through the valve are closed, and the weight which keeps up the arm of the ball-cock is raised, so that the cistern fills with water. On the raising of the seat, the passages through the valve are opened and the water in the cistern then flows into the pan.

[Printed, 4*d*. No Drawings.]

A.D. 1859, October 12.—Nº 2320.

CARRICK, James.—" Improvements in commodes, water- " closets, and other sanitary appliances."

" The invention relates to the application of deodorizing materials by suitable mechanism to the contents of commodes, water- " closets, or other conveniences."

An elevated box or cistern contains the deodorising material, and in the passage between this box and the basin of the water closet certain valves are placed that work reciprocally. The cover of the water closet is connected with the valves by means of cranks, rods, and levers, by which motion is conveyed from the former to the latter. During the raising of the cover the inner valve is raised and the external valve is closed, thus measuring the quantity of material to be admitted to the pan when the cover is depressed and the action of the valves thereby reversed. The raising of the external valve causes the material to pass downwards and to form an inclined plane under the seat and within the commode, and from thence to fall into the vessel underneath the basin. The material is assisted in its passage from the box by an agitator attached to the valve and by a rake attached to the cover of the seat.

In the case of a water closet, the cistern containing the deodorising fluid is placed above the seat. A pipe is carried therefrom to the basin, and two cocks (that work reciprocally by means of levers) are fixed upon the said pipe. The fluid mixes with the contents of the closet pan and passes away in combination therewith.

[Printed, 6*d*. Drawing.]

A.D. 1859, November 23.—N° 2655.

LISTER, THOMAS.—"Improvements in the construction of "sanatory privies and waterclosets, part of which improvements "is applicable as a tap for drawing off liquids."

"The chief object of this invention is to convert common "privies into water-closets, and provide for the discharge of the "excrement into a common sewer or closed cesspool."

The waste water from dwelling houses, or surface drainage from land, is utilized by collecting the same into the soil pan or a brick vault with which the closet is provided. The water thus collected is used to flush "the pan or vault from time to time, as may "be required without the aid of any apparatus further than a "trapped plug of simple construction." A regular system of water supply may be employed as an auxiliary to the said waste water supply, or independent of the same.

The pan of the water closet may be made "of a dish form, and "with a lip for trapping the drain. In rear of this lip the pan "or receptacle takes the form of a bent tube, through which the "soil is discharged into a chamber in connection with the sewer, "but cut off therefrom (except at the time of flushing the pan)" by means of the above mentioned trapped plug, which is raised from its conical seat either by a rock lever or chain.

Water from a supply cistern may be led into a closed vessel in the closet, and discharged therefrom by means of a draw rod, which is operated by the person using the closet. A rock lever jointed to the rod works the inlet valve, which consists of a tube closed at its upper end by an inverted cup, but furnished with lateral openings. A coiled spring presses the edge of the cup down upon an elastic cushion in the bottom of the box in which the valve is fixed. The supply water finds no vent until the rock lever lifts the cup off its seat.

The inverted cup valve may also be used for drawing off water and other fluids, it being self-closing.

[Printed, 10*d*. Drawing.]

1860.

A.D. 1860, January 31.—N° 246.

MITH, George.—"Improvements in monuments, fountains, "lamps, letter-boxes, urinals, and such like ornamental and "public erections in cast-iron."

1st. "The construction of monuments for graves and other "places."

2nd. "Cast-iron fountains and lamps."

3rd. "Cast-iron lamps and street letter-boxes."

4th. "Forming cast-iron walls or enclosures for enclosed urinals "and similar erections."—The drawings show a five-celled urinal constructed according to this invention. "The panels and frame "or pillar portions are cast together, and the separate pieces are "united or connected together by means of spigot and faucet joints "in the pillar or frame parts, which parts are tubular, the joints "being keyed or otherwise secured, as may be required." The frame or pillar portions, which may be cylindrical or of other ornamental or convenient form, have portions of the panels or intermediate portions cast upon them, whilst the joint lines are covered by beads or mouldings on the joint edges, one bead or moulding being cast on the outside of one piece, and the other on the inside of the other piece. The inside moulding is formed with snugs for the reception of screws to fix the pieces together.

[Printed, 10d. Drawing.]

A.D. 1860, January 31.—N° 252.

CULPIN, Thomas.—" Improvements in waterclosets and all " sanitary vessels that require frequent flushing."

" These improvements consist, first, in the application of a " flexible diaphragm to retain the water in closets " " at any re- " quired level. In the centre of this diaphragm I have a hole, " through which the contents of the vessel are discharged into a " common trap whenever the closet handle is lifted, the handle " being connected to the diaphragm by a weighted lever so as to " force it down below the water-line. Second, in an arrangement " of pan closets, so as to admit of those parts usually made of " iron and copper to be constructed entirely of earthenware" " I hang the pan upon a flexible hinge," " and I cause it to rest " upon flexible stops. For some purpose I make the pan of " flexible material." " Third, in a mechanical arrangement for " making the flushing apparatus of such waterclosets and other " sanitary vessels self acting. For this purpose I use a lever having " its fulcrum " " at a point about two-thirds of the whole length " of such lever from one end. To the long end is attached a jaw " or pall, to the other end is attached a weight. When a person " sits upon the closet or stand upon the urinal " " the weight of " the person causes the long lever to descend, and in that position " the jaw or pall takes hold of a rod in connexion with the flushing " apparatus, and immediately the weight of the person is removed " the descent of the weight produces the required action. Fourth, " in an arrangement of valves in connection with such waterclosets " and other sanitary vessels. In this arrangement I use a valve " opening against the pressure by means of a weight acting upon " one or more cam levers." The weight is hollow and is open underneath, it has a hole at its top, " the size of which hole de- " termines the period of time occupied by the closing of the " valve."

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1860, February 11.—N° 372.

WRIGHT, James.—(*A communication from Max Schloss.*)— (*Provisional protection only.*)—" Improvements in the construction " of waterclosets."

In a fixed closet " the bottom of the pan is constructed so as to " form a valve seat, which is polished, and has an annular ring

" or groove upon which a disc valve fits, this valve is also polished
" and has a corresponding ring of india-rubber, which fits into
" the groove on the face or seat, and thus forms a hermetical
" seal, so as to prevent any smell from rising; the valve is
" opened and shut by means of a handle and lever, which carries
" it to the right or left. When the closet is portable I form a
" movable chamber for the solid faecal matters, and another
" for the urine." " Each of these chambers is covered with an
" air-tight cover, a tube from the former conveying away the
" vapours or odour, and the syphon termination of the tube
" leading into the latter prevents any gases from going back
" into the pan. By means of a piston and a barrel communi-
" cating with the water supply the pan is washed out."

[Printed, 4*d*. No Drawings.]

A.D. 1860, February 15.—N° 419.

JENNINGS, JOSIAH GEORGE.—" Improvements in waterclosets,
" urinals, and lavatories."

This invention consists in forming the basins of water closets, urinals, and lavatories with lips or hollow projections, and mounting them so as to work on centres or axes. Above these basins is fixed a small cistern, having a compartment at the bottom. When the basins are turned on their axes the contents are discharged over the lips, and a valve in the bottom of the cistern opens, allowing water to flow into the compartment. When the basins are again brought into position the lips act on the valves so as to allow the water in the measuring compartment to flow into the basin, and at the same time prevent the flow from the supply cistern into the measuring compartment. The basin of a urinal is brought into position for use, by means of a lever, connecting rod, rack, and pinion, the lever being acted upon by a hinged platform or foot board. The waste pipes for the cisterns of lavatories and urinals are constructed with a flap or back valve, which permits the flow from the waste pipe, but prevents impure air passing upwards from the drain.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1860, May 26.—N° 1302.

MOULE, JOHN.—(*Provisional protection only.*)—" An improved
" *apparatus applicable* to flushing purposes."

To effect the object of this invention, "I make use of a pulley "wheel, or instead thereof a lever supported by a pillar in the "centre (similar to a scale beam) from the bottom of the reservoir "or cistern, or in some other convenient way." "To one end "of this lever I connect a float, which is attached to a clack or "other valve at the bottom of the reservoir or cistern. This "float should be of sufficient weight and size, that when acted "on by an accumulated height of water shall have buoyancy "enough to lift the valve attached to the bottom of the reservoir "or cistern. To keep this valve open and allow the whole of the "contents to escape, I make use of a floating bucket, which "when empty is lighter than the float, such bucket being pro-"vided with a small hole at the bottom, and is attached to the "lever, and placed at the opposite end to where the float is con-"nected." "When the water is sufficiently high in the reservoir "or cistern to cause the float and valve to rise, the bucket is at "the same time filled with the liquid, thereby becoming of "greater weight than the float, by which means the float and "valve are kept up till the whole of the contents of the reservoir "or cistern are discharged, by which time the bucket will have "emptied itself through the opening at the bottom, and becom-"ing again lighter than the float allows the valve to close."

[Printed, *4d.* No Drawings.]

A.D. 1860, May 28.—N° 1316.

MOULE, HENRY, and BANNEHR, JAMES.—"Improvements "in the nature and construction of closets and commodes for the "reception and removal of excrementitious and other offensive "matter, and in the manufacture of manure from thence."

1st. Dry and powdered earths are distributed over a suitable surface within the closet, ready to receive fresh excrementitious matters. The said matters may be immediately dusted over with the said earths. The materials used for deodorizing and mixing with the said matters are clay, loam, and fresh earth. If the said earths have been used to deodorize the excrementitious matters, as above, and be again dried and reduced to powder, they "may be again "and again used, and the manures thus produced will be much "stronger."

2nd. Certain apparatus to be used in closets and commodes for employing the above-mentioned earths, which are also applicable "when using other deoderents."—At the bottom of the case of the closet, a bottom or flap moves on a horizontal axis which is worked by the handle, a rack being formed on the handle and a sector being placed on the axis of the flap, into which the rack gears. When shut, the flap is slightly inclined, so as to separate the urine from the fæces. When the handle is pulled up, the bottom or flap inclines "to such an extent that the powder and " the excrementitious matters therein will descend or slide off " the bottom." The bottom may be brought back by means of a spring. On arriving at its original position, certain arms cause a rotary feeder to distribute a quantity of powdered material over the said bottom. In another apparatus a sliding bottom, fixed on an upright axis, is employed. The handle of the closet gives motion to the axis and also to a stirrer which mixes the excrementitious matters. In a third apparatus, the bottom is suspended by straps and the lower edge of the case forms a curve corresponding with the radius of the straps. A toothed rack and sector communicate motion to the axis of the straps.

[Printed, 8*d*. Drawing.]

A.D. 1860, June 16.—N° 1467.

MOULE, John.—" An improved self-acting apparatus for pre- " cipitating and collecting from solutions metals and their salts, " part of which apparatus is applicable to flushing purposes."

"The arrangement of the apparatus," "when connected to " vessels having two compartments, is well adapted for closets " and urinals for discharging with the flush of water a sufficient " quantity of disinfecting fluid." To one end of a lever is connected a float and the exit valves, one in each compartment; to the other end a bucket and counterbalance weight is attached. When the liquid is sufficiently high in the vessel to cause the float and valves to rise, the bucket is also filled. When the contents of the vessels are discharged, the bucket will have emptied itself by the cock at the bottom, and consequently the valves close.

The following is one of the parts of this invention, which is applicable to flushing purposes. "Connected to the interior of " the vessel to be discharged is a small supplementary vessel, " the upper or open part of which is on a level with the water " line. This vessel is provided with a cock, valve, or other open- " *ing*" "*at the bottom* for discharging itself, and thereby regu-

" lating the time for closing the valve at the bottom of the " cistern." "The float" "is connected with one arm of the " lever," "and works in the supplemental vessel as follows:— " Supposing the liquid has risen sufficiently high to flow into the " supplementary vessel, it causes the float and valves attached " thereto to rise, which in this case are kept up until the sup- " plemental vessel has discharged its contents."

In another part of the invention applicable to flushing purposes, a tubular socket is fixed through the centre and bottom of the supplementary vessel, and is carried above the water line. The rod connected to the valve passes through the said tube, and is attached to a tubular float. When there are two compartments, the valve in the second compartment is hung from a lever which is acted upon by the float.

[Printed, 10*d.* Drawing.]

A.D. 1860, June 22.—N° 1521.

MACFARLANE, WALTER.—"Improvements in waterclosets " and sewerage and sanatory apparatus or appliances."

The parts of this invention which relate to water closets are as follows:—

In dry water closets, or receptacles for fæcal and other similar matters, the cast-iron trough or receptacle is fitted with a discharge valve at the end. The bottom line of the said discharge valve " is in a line with the bottom of the trough or slightly dipping " or inclined," one surface of the valve being of an inelastic substance, whilst the corresponding surface is of an elastic material. The valve has a hinge and lock, and its actuating parts are on the outside of the closet; fastening levers or hooks keep the valve water-tight. A slide valve is fitted to the same kind of discharge opening. These water closets can be emptied of their contents by the dustman without his having access to the interior.

The cast-iron sections which form the walls of public conveniences, according to this invention, are constructed with minute perforations in the panels, for the purpose of obtaining a more complete system of ventilation than has been obtained heretofore.

The contents of the said water closets may be discharged into suitably constructed dust bins, for the purpose of storing the combined results and applying the same as manure.

The said apparatus may be applied to soil tanks, in connection with the usual water closet system of towns. The solid matters are emptied as above set forth, and in order to discharge the liquid matters to the sewers, the inlet pipe dips down to near the bottom whilst a perforated plate divides off a corner of the tank, the holes in the said plate only allowing the liquid to pass off through them.

Other improvements relate to gutters and roofs and to rain water or other external pipes.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1860, June 23.—N° 1530.

WARD, James.—(*Provisional protection only.*)—"Improve-" ments in waterclosets."

"These improvements relate to the mode of supplying water to " a closet by means of a regulator, which I accomplish in the " following manner:—A plunger or piston works freely in a " regulator or water-tight cylinder. Fixed to the plunger is a rod " serving as a piston rod, which passes through a stuffing box in " the top cover of the regulator or water-tight cylinder. The " plunger or piston is raised by any suitable means in connection " with the piston rod, and worked by the handle of the closet. " It is forced down by weights fixed on the piston rod. The " inlet and outlet pipes for the water are fixed to the bottom of " the water-tight cylinder. The inlet pipe is opened or closed " by a conical or other valve. When the piston is lifted by rais-" ing the closet handle, the pressure is taken from the top of the " valve, and it is opened by the pressure of the water beneath, " which flows into the cylinder, and on pushing down the closet " handle the weights fixed to the piston rod force down the " plunger or piston, which presses upon the water contained in " the cylinder, forcing it out at the outlet leading to the closet " pan, and at the same time closes the inlet by the pressure on " the top of the valve being greater than that underneath. A " valve may also be put in the plunger to allow any water that " may accumulate at the top through leakage to pass through."

[Printed, 4*d.* No Drawings.]

A.D. 1860, June 23.—N° 1532.

JONES, Henry.—"Improvements in waterclosets."

The basin, which has a flange round the upper edge, is set in a *vessel of glazed pottery* or earthenware. "The bottom of this outer vessel is closed, there being a side outlet suitable for connecting with a glazed earthenware pipe. Below the end of the basin there is a pan of glazed pottery or earthenware made with necks or axes, which are received into bearings formed within the outer vessel near the bottom. The pan is so hung on its axis that when full of water it will stand horizontal, and the water therein will rise above the lower end of the basin. The front part of the pan is made with a spout, so that when tilted the water and soil will be completely emptied therefrom. At the back of the pan a suitable connection is made to a handle on the seat of the closet, such connection where it passes out through the seat being made air-tight by vulcanized india-rubber or otherwise."

[Printed, 6*d*. Drawing.]

A.D. 1860, July 14.—N° 1705.

CORNISH, Samuel Tom.—(*Provisional protection only.*)—"Improvements in ship's closets."

"My invention which relates to improvements in ship closets, consists in the application of a slide valve or sliding plate for the purpose of closing the passage from the closet to the sea. This closet is principally adapted for emigrant ships, in which it is desirable to have the closet apparatus such that it shall not get out of order. I place this valve at the lower" [part ?] "of the basin or receiver, & between the surfaces of a double bottom. The simple act of withdrawing the slide opens the passage to the sea, which withdrawal may be effected by simply pulling the slide, or by a lever, or otherwise. In fine weather I leave the slide open, whereby the wash of the sea at all times cleanses out the closet pan & channel therefrom, the closet being placed at an elevation suitable for such effect. In rough weather I close this slide or slide valve, and open it periodically only for a short time. The passage from the valve to the sea is, however, always open to the wash of the sea, and is, therefore, always kept free. The slide valve may be vertical, horizontal, inclined, or in any other suitable position at the bottom of the pan."

[Printed, 4*d*. No Drawings.]

A.D. 1860, September 5.—N° 2147.

KINIPPLE, Walter Robert.—"An improvement in water-*closets*, and in flushing tanks or apparatuses."

The principal features in this invention are:—In respect to flushing tanks, "the combined employment therein of a float valve "plug and weighted lever." In water closets, the application thereto of the flushing tank above alluded to.

In applying the balance float valve apparatus to a house closet, a hollow, elongated conical float valve fits into a seat in a pipe which proceeds from the bottom of the pan, and, when it is closed it shuts the outlet through the trap. The valve is connected by a chain to a weighted and adjustable lever. A space all round the upper part of the valve allows the water supplied to the pan to enter the float chamber. When the float commences to rise, from the buoyancy of the entering water, the balance weight falls, raises the valve, and the whole of the contents of the pan are suddenly discharged. The valve then falls and the outlet is closed.

In a flushing apparatus, another form of float valve is used, and the weighted lever does not come into action until it is released from a catch by the float. In another arrangement, the weighted lever retains the float valve on its seat and maintains it off its seat until acted on by a supplementary float.

The said flushing apparatus may be employed as a liquid meter.

In an apparatus for flushing sewers a float is employed to liberate the arm of the weighted lever from a catch.

[Printed, 10*d*. Drawing.]

A.D. 1860, October 9.—N° 2451.

ANDERSON, ROBERT.—"Improvements in apparatus for "economizing and regulating the flow and passage of fluids for "flushing waterclosets."

"I prefer making the cistern of a shape having length, so that "the float will have sufficient leverage for opening and shutting "the supply tap. This tap is fitted through the side of the "cistern, and is operated in the usual manner by the float above "referred to. The tap supports on a joint or pivot the operating "balance, the one end of which passes over or through a slot or "opening in the cistern and communicates with the seat or hand-"pull; the other end is jointed with or coupled to three parts; "the one nearest to the centre joint or pivot consists of a guide "which passes round the float lever, the use being to shut the "*supply tap when flushing*, thus preventing more than the quan-"*tity contained in* the cistern from being used. The next in

" order from the centre joint or pivot is the discharge valve or " flushing outlet arrangement, which is formed of a tube fitted " with a properly ground valve to fit into a seating in the bottom " of the cistern; the tube serves also as an overflow pipe. The " third in order from the centre joint or pivot is a balance weight " fitted at or near to the end and sufficiently heavy to close the " valve."

[Printed, 6*d*. Drawing.]

A.D. 1860, October 10.—N° 2463.

HOBSON, Aaron, and **HOBSON**, James.—(*Provisional protection only.*)—" An atmospheric trap for the prevention of smells " arising from cesspools, drains, waterclosets, urinals, or any " other place where smell may arise."

" By this invention a trap can be fixed in the soil pipe of a " closet, doing away with the present syphon and S-traps now " used." " The trap is made to admit the water at the top be- " tween two pieces running across the top but open in the centre, " which forms a part of the trap. The water then runs upon " another piece or shelf across the centre of the trap, from thence " into the drain or cesspool. The foul air is stopped by coming " in contact with the bottom shelf, which prevents it rising any " higher, and the atmospheric air having filled the top above the " last-mentioned shelf prevents the foul air from expanding and " making its way to the surface."

[Printed, 4*d*. No Drawings.]

A.D. 1860, October 10.—N° 2467.

MAXFIELD, Arthur.—(*Provisional protection only.*)—" Im- " provements in the construction of waterclosets and urinals, " together with flushing apparatus connected therewith, which " said flushing apparatus is also applicable to the watering of " gardens, the cleansing of windows, or for other purposes."

They consist in " the use or employment of an air-tight cistern " in lieu of an open cistern as heretofore used, with a double " valve inside a T-pipe, which is connected by having one end " attached to the street main and the other end to the basin, the " T-pipe being connected to the bottom of cistern. There is a " small lever having a swivel joint on the top side thereof and " another lever running down the swivel which is connected with " the double valve in the T-pipe. A lever is placed on the swivel

" or vulcanite." The process of vulcanization affords perfect " chemical adhesion " of these two substances to each other. The united compound is termed "junction rubber."

"In the formation of india-rubber valves great flexibility is " essential in that part of the valve which covers the bore or " waterway, but such flexibility is not needed, and proves an " impediment to the proper fixing in other parts."

One of the applications of this compound material is to sockets or tubing of various diameters and thickness.

" In some cases where a flexible joint is required, as in con" necting the basin of a water-closet with the supply pipe, the " junction of hard and soft may be crosswise."

The drawings show, amongst other examples of the applications of this invention, a ring of the junction rubber, " with the outer " surface of the hard material, and the body and inner surface " elastic. These rings may be made of any size and diameter, " from 2 inches to 2 feet and upwards, and are suitable for " hydraulic or lift pumps for sewer and water works of the " largest dimensions."

[Printed, 8*d*. Drawing.]

A.D. 1861, January 30.—N° 249.

PHILLIPS, HENRY, and **BANNEHR**, JAMES.—" Improve" ments in urinals, and in the manufacture of manure."

Vessels are used to collect urine at urinals; combined therewith, or with the pipes leading thereto, are suitable traps. Charcoal, or other deodorising matter, is placed in the cover to the said vessel, so that the products evolved from the decomposing urine can only escape into the air through a layer of deodorising matter.

The drawings show a cylindrical storing vessel with a cover that fits the vessel in an air-tight manner. The cover consists of a conical portion, with a pipe that dips into a small vessel, so as to form a fluid joint. Underneath the conical portion, a chamber is attached, by means of a bayonet joint, the said chamber being perforated at the bottom, and containing charcoal in a granular state; there is an outlet at the upper part of the chamber. The chamber and trap may be at a distance from the vessel and connected to it by a suitable pipe.

An apparatus is also shown, in which a urinal is in combination *with a rain-water pipe*. In this instance, two traps are combined together, the inlet from the urinal entering from the side of the lower trap, and the rain water entering from above and passing through openings in the lower part of the trap cover, which covers the whole arrangement.

The invention also relates to the employment of urine in the manufacture of manure.

[Printed, 8*d*. Drawing.]

A.D. 1861, March 1.—N° 526.

SMITH, George, and CARRICK, James.—" Improvements " in commodes or closets, and in bathing, washing, and other " sanatory apparatus."

In carrying out these improvements, cast iron is employed in the general construction of the apparatus.

" A system of commode, closet, or receptacle, wherein dry " material, such as ashes or earth, is thrown upon or made to " cover the excrements, for the purpose of absorbing moisture " and preventing hurtful effluvia." This part of the invention is an improvement upon apparatus set forth in No. 2320, of the year 1859. In the apparatus described in the said Specification, the action of certain valves caused the ashes to descend from a case, and a rake loosened the material; in the present invention, the case is constructed with movable portions " constituting more or less of the bottom and " sides, and arranged so as to receive a " slight movement from the mechanism connected with the " valves, or from separate contrivances." " This moveable " bottom may be used alone or in combination with the rakes " and valvular mechanism described in the Specification already " referred to, or with different mechanism."

This apparatus is also " applicable to urinals and to collecting " vessels, being in such cases actuated in connection with a " moveable foot plate, cover, or door, or otherwise."

In some urinals, arrangements are made for draining off liquid not absorbed by the dry material. The case containing the ashes may be made to serve as a cover for the seat, and the act of drawing it forward may cause the ashes to fall.

The ashes are thrown, for collection, into receptacles divided by perforated screens.

Other portions of this invention relate to bathing and washing apparatus.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1861, March 6.—N° 572.

ESKHOLME, George.—" Improvements in apparatus for re-
" gulating the supply of water to waterclosets, and for other
" purposes where an occasional or intermittent supply is required."

" It is proposed to employ rotatory vanes, which are kept in
" motion by the descent of a weighted lever in connection with
" the plug of the cask, or the water-supply valve, thereby retard-
" its descent, and consequently regulating the quantity of
" water that is allowed to flow. This period may be varied, so as
" to allow more or less water to flow, either by increasing or
" diminishing the size of the vanes, or varying their position as
" regards the centre, or by causing them to feather. These vanes
" may be combined with a rack and suitable gearing for actuating
" the same, so that the descent of the weighted lever will rotate
" the vanes. If desired, a pendulum and escapement movement
" may be substituted for the revolving vanes for the same
" purpose."

[Printed, 8*d*. Drawing.]

A.D. 1861, April 9.—N° 876.

TAYLOR, Francis.—" Improvements in apparatus for receiving,
" drying, and deodorising human excrement."

A floor is so inclined that the urine may run to one place, either to be discharged into the sewer, or to be retained in a suitable vessel, for the purposes of irrigation. Upon the said floor is placed a large turntable, which revolves upon a central pivot, and has notches at its outer edge, so as to admit of its being turned a short distance after each time of use. " These notches are to be " caught by a spring connected with the heel of the door of the " privy or otherwise acted on, so that each time the door is " opened the turntable shall be moved one notch;" the seat of the privy is placed over the outer part of the turntable. A thorough draft of air is allowed between the turntable and the floor of the privy, which is smell-tight. " By this process the " excrement is dried by natural means, just as guano is dried." The soil is washed off the paper which is used in this privy, by soaking the said paper in water; it is then scalded and made up again into paper.

In large establishments, artificial heat may be introduced, either by a furnace and flue for the purpose, or by allowing some of the heat and soot from a house flue to enter under the privy floor. Instead of employing heat, "an ash-house may be con-" structed over the outer edge of the turntable, opposite to that " over which the seat of the privy is, so that coal and wood " ashes may be sifted daily, and falling through a hopper may " be deposited on the excrement, and absorbing its moisture " may dry and deodorise it." "For perfect deodorisation a " funnel of coal tar may be placed under the seat of the privy " out of the way of any accident, to drop occasionally a drop " of tar upon the recently deposited excrement, and so com-" pletely to deodorise it."

[Printed, 6*d.* Drawing.]

A.D. 1861, May 18.—N° 1269.

PONTON, Archibald Campbell.—(*Provisional protection only.*)—The inventor declares this invention to be for "com-" bining together siliceous powder into solid masses of any form " by means of sulphur, and which combination I call silicious " stoneware."

Amongst other purposes, this invention is applied to utensils, soil pipes, and sewers.

"The 'siliceous stoneware' is composed of ground flints " ground quartz, or Lynn sand, or Tripoli or siliceous powder " from any other source, and as much melted sulphur as is " necessary to unite the siliceous particles together, and form " them into a mass adapted to the various purposes to which " the ware may be applied. Any colouring matter may be added " to the mixture of silica & sulphur to alter or vary the tint " of the ware. The silica powder is added gradually to the " melted sulphur, and intimately mixed with it when still hot, " and in its fluid or plastic state it can be brushed or spread upon " surfaces, run or pressed into moulds or dies, rolled into plates, " or coat any substance immersed into and then withdrawn from " it.

"I use the 'siliceous stoneware' for the formation of fountains, " statues, busts, vases, and utensils, reliefs, dies, moulds, gas " pipes, water pipes of every description, soil pipes, and sewers, " also for walls, ceilings, roofs, floors, and architectural mouldings " & ornaments. I also use the ware as an air and waterproof " covering for wood, iron, stone, walls of brick or stone, and " boat or ship bottoms. I also use the siliceous stoneware when

" in its melted state as a cement, as a lute, and as a mortar. As " soon as the silica & sulphur becomes cold it solidifies into a " hard substance, which can be remelted and used over again if " necessary."

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 18.—N° 1570.

DIXON, John.—" Improvements in waterclosets and cocks use " therewith."

A communication is formed "from the bottom of the water- " closet pan or basin to a vessel placed behind the closet, in which " is a ball of a ball cock; when the handle or seat is at liberty the " valve at bottom of basin is shut, the water rises in the basin, " and at the same time flows through the pipe to the vessel behind the basin, and raises the ball which is connected to a lever " in communication with a cock or valve, and shuts off the supply " to the basin, leaving the water standing in the basin up to the " level of the overflow pipe. In my self-acting watercloset I use " a cataract cylinder or chamber with a flexible disc for holding " the valve at bottom of basin tight, and by regulating the supply " of water to the cylinder or chamber, the basin can be allowed " to wash out during any required time."

" The construction and arrangement of the ball cock which " can be used for other purposes is as follows :—Two fixed elastic " rings with a perforated ring between them are used; by this " arrangement the pressure of the fluid offers no resistance against " the spindle of the valve, as it does not press against a seat but " goes into both rings; there is little or no wear on the spindle, " as it works against the elastic rings, which can be easily " renewed."

[Printed, 8*d*. Drawing.]

A.D. 1861, July 8.—N° 1730.

WARNER, Frederick, and CLARK, Thomas.—(*Provisional protection only.*)—" Improvements in apparatus for supplying " water to waterclosets."

" The water from the source of supply is received into a small " vessel, which is preferred to be of a semi-cylindrical form with " axes or necks at the ends, which turn in suitable bearings in an " outer cistern or vessel of somewhat larger dimensions than the

" inner one, which receives the water from the source of supply.
" At the bottom or lower part of the outer vessel is an outlet with
" a pipe communicating with the basin of the watercloset."
" The inner vessel, which first receives the water, is arranged to
" be tilted by the ordinary handle of the watercloset" " by which
" the contents of such inner vessel will be emptied into the outer
" vessel, and such water will descend into the basin by the water-
" closet as soon as the inner vessel has again assumed its
" horizontal position, but the water will not flow from the outer
" vessel to the watercloset before the inner vessel assumes its
" correct position, by reason of there being a valve in the outlet
" which is in connection with the inner vessel, and which is
" closed till that vessel assumes a position again to receive a
" fresh supply of water." Water is supplied to the inner vessel through a valve regulated by a float or otherwise.

[Printed, 4*d*. No Drawings.]

A.D. 1861, August 13.—N° 2014.

COMMON, NICHOLAS.—(*Provisional protection only.*)—" Im-
" provements in apparatus applicable to waterclosets and urinals."

Water sufficient for one discharge is collected in an air-tight vessel. " As the water accumulates air contained in the vessel is
" compressed, so that when the discharge takes place the water
" will rush out with a force due to the degree of compression of
" the confined air. The air vessel is brought into communica-
" tion by means of a pipe with the reservoir or other water supply
" apparatus, the vent of which pipe is capable of being closed by
" the rise of the spindle of the closet supply valve. The spindle
" works through a stuffing box in an elbow discharge pipe, and
" carries at its upper end a disc valve, which has its seat on the
" upper face of the elbow. In the head of the spindle a deep
" cross cut is made, to form a passage for the water from the
" supply pipe to the air vessel. The head of the spindle is
" capable of sliding in an elbow or lip of the supply pipe, and
" when in its lowest position (which will be when the valve is on
" its seat), the small vent formed by the cross cut in the head of
" the spindle will allow of water flowing in a small stream into the
" air vessel. When, however, the valve is raised to discharge
" water into the closet pan, this supply will be cut off. The
" spindle is jointed at its lower end to the ordinary lever of the
" closet, so that when that lever is raised in the usual way, the

" valve will rise and discharge the water." To guide this discharge over the surface of the pan and effectually to cleanse it, the pan is formed with a hollow rim projecting inwards. "When " the lever is allowed to fall the spindle will also fall, this tendency being increased by the pressure of the supply water on " the head of the vessel. The valve being now again brought to " its seat, the discharge of water will be effectually cut off, and " the supply of the air chamber will recommence."

[Printed, 4*d*. No Drawings.]

A.D. 1861, October 12.—Nº 2554.

CARTWRIGHT, MATTHEW.—(*Provisional protection only*.)—"Improvements in stench traps."

This invention is "applicable to waterclosets, sewers and " sinks," and it "consists in covering the closing plate or trap " either wholly or partially on its closing side with vulcanized " india-rubber alone, or in combination with other suitable " materials, a similar covering being applied to the surface upon " which the flap closes, so that a perfectly tight joint is obtained, " which will preclude the possibility of any stench or effluvium " passing or escaping through it. This joint may be so disposed " as to form a species of tongue and groove, the one surface " having a groove or channel formed into it, and the other a " corresponding raised rib or projection fitting into the channel, " one or both surfaces being covered with elastic packing material. " When applied to a watercloset the hinged lid or flap has a " weighted lever attached to it, which keeps it closed against the " bottom of the pan when not in use.

"According to another arrangement applicable to sinks and " sewers a cylindrical box or case is used having a lid or cover " (packed with india-rubber) screwed down thereon by means of " a central screw spindle and handle so as to exclude all affluvia."

[Printed, 4*d*. No Drawings.]

1862.

A.D. 1862, February 4.—Nº 290.

MANWARING, GEORGE.—"Improvements in flushing apparatus for closets, sewers, and other water services."

This invention "consists of self-acting mechanical appliances, " whereby the closet is cleansed after the same has been used, " by means of supplying water through a cistern connected to " and working with a small supply cock or inlet valve," to which an air vessel is applied, so that said inlet valve may be worked with ease against any pressure. The large outlet valve of the cistern is closed while the inlet valve is opened, and vice versâ.

The following is one of the methods of carrying out this invention:—A loaded floating ball (in the interior of the cistern) is attached to a lever which has its fulcrum on the casing of the inlet valve; the tail of the ball lever can thus open the said valve (a seat valve kept down to its seat by a helical spring) against any pressure, when the ball is depressed. The ball lever is regulated " by a connecting rod having adjusting stops and pins in it, " which causes a proper pause of time in the action in the opening " and shutting of the supply and discharge valves." "The " lower end of this connecting rod is jointed to the discharge " valve, in the middle of the rod the lever of the floating ball " works, and the upper end of this rod is jointed to the working " lever, which takes its fulcrum from the end of the cistern at " that part of this lever where it is attached to the connecting " rod; the under part of the joint is acted upon by a lifting arm " on the weigh or weighted shaft, which is provided with guides " for the connecting rod; the lifting arm raises the working " lever, and the connecting rod by means of the counterweight " after the same has been kept down by the closet being occu- " pied, during which time the cistern is filling with water; by " this motion it causes the supply valve to close and the discharge " valve to open."

As the supply cistern is only charged during the time the closet is occupied, it cannot be affected by frost.

[Printed, 10*d*. Drawing.]

A.D. 1862, February 15.—N° 403.

RENISON, THOMAS.—"Improvements in water-closets."

"In one modification, the discharge outlet from the basin is " to one side and communicates with a chamber, the bottom of " which leads by the usual trap bend to the discharge pipe. The " lower part of the valve chamber is made with two inner shells " rising up from the bottom round or outside of the outlet in " the bottom, and parallel to the sides, so as to form two narrow

" spaces running round and open at the top. The valve or
" closing detail consists of an inverted cup formed with two sides
" shaped so as on being lowered to enter the narrow spaces
" described, as formed round the lower part of the valve chamber.
" This inverted cup valve is opened by means of a rod and
" handle by which it is lifted directly upwards, and the upper
" edges of the valve chamber shells being on that side slightly
" below the basin outlet, the discharge takes place across them
" into and down the centre of the chamber." The valve rod is connected with the water supply so as to flush the basin and to fill it to a certain height. A ball cock, in a side chamber that communicates with the basin, cuts off the supply when this height is obtained. "The spaces in the valve chamber become filled
" with water whilst the space between the shells of the cup or
" valve is filled with air, and on the valve being lowered the air
" becomes compressed by the water in the chamber spaces so
" that it will support a column of water in the basin of a suffi-
" cient height determined by the proportions of the parts.
" Should the water in the basin from any cause rise above this
" height, the air will be forced down out of the space in the valve,
" and up into the inner chamber, the water following it and thus
" overflowing, whereby the basin will be prevented from filling
" above the proper height. The cup or valve and the chamber
" spaces are shaped so as to work with perfect freedom and may
" consist of simple castings devoid of expensive fitting or
" finishing."

[Printed, 10*d*. Drawing.]

A.D. 1862, February 15.—N° 407.

WALL, JOSEPH, and DODD, THOMAS.—(*Provisional protection only.*)—" Improvements in the construction and arrangement of
" apparatus for regulating the flow or passage of fluids."

This invention principally relates to flushing water closets.

One part of this invention consists " of an equilibrium three-
" way tap or apparatus, so planned that by movement of the
" spindle a supply of fluid is permitted to flow through in one
" direction, and, by movement the contrary way the supply is
" closed, and the same fluid returned through the same tap or
" apparatus, and finally passed off or discharged by a third way."

To economise flushing fluids, the system with pressure cistern *and pressure* seat is adopted. The above-mentioned tap is fitted to the supply pipe; "it is also secured to a second pipe for carrying the flushing fluid to the pressure cistern," and from the pressure cistern back again to the tap, and also to a third pipe for carrying the said flushing fluids from the said tap to the pan. Thus the tap is so placed that the depression of the seat acts on the spindle, closes the passage to the pan, opens the supply valve to the cistern, and permits the flushing fluid to pass into the pressure cistern, in quantity according to the height of the supply column. The rising of the seat closes the supply valve, "and " communication is only open between the pressure cistern and " watercloset pan, into which latter, by way of the second " and third pipe connections herein-before mentioned, the flush- " ing fluid will be discharged with force by the pressure of the " compressed air contained in the said cistern. As all the parts " act simply by the weight of the person using the closet, and as " the quantity of flushing fluid contained in the pressure cistern " is all that can be used at one time or by one movement, waste " is prevented."

[Printed, 4*d*. No Drawings.]

A.D. 1862, February 26.—N° 523.

KING, Thomas, and VARVILL, Robert.—"Improvements " in apparatus for controlling the flow of fluids for flushing " waterclosets."

"To the ordinary connections of the hand lift or pressure seat " arrangements, we joint or otherwise connect a lever, which is " carried into the cistern, and balanced or supported on the end " of the horizontal plug or barrel of a tap fitted to the supply " pipe. On the other end of this lever is affixed the float, and " between the said tap and float is attached a chain or lever " which reaches to or near to the bottom of the cistern and " operates the outflow or flushing valve. The overflow pipe is " cast with the cistern and communicates with the flushing or " waste pipe in the usual way." "When the part of the lever " outside the cistern is acted on, the float will be raised, the " supply tap shut, and the outflow or flushing valve opened; but " as soon as the lift or pressure seat is left at freedom the float " falls and opens the supply tap, until such time as the cistern is " again filled."

[Printed, 8*d*. Drawing.]

A.D. 1862, May 31.—N° 1640.

SMALLWOOD, William Thomas, and WRIGHT, William. —"Improvements in waterclosets."

This invention consists in forming certain parts of water closets in the manner herein-after described.

The water-conducting and stopping media are placed at the front of the closet. A tap is so coupled to the service pipe that it may readily be detached and replaced. The plug of the tap turns upon the spindle that carries the seated valve at the bottom of the soil pan. A tumbler lever is mounted upon and between the said plug and spindle for actuating the same. The couplings of the plug and spindle are so formed that one may be partially moved about their common axis independent of the other, "thus " providing the means by which a single lever is rendered capable " of first opening the tap or valve on the service pipe, and then " tipping the valve or pan at the bottom of the soil pan, or vice " versâ;" the plug of the tap and the pan valve may be opened and closed by one lever simultaneously. In fitting the tap to the flushing pipe and removing it therefrom, the plug of the tap can be turned freely upon the spindle to any required extent; "and " by bringing this tap forward and coupling it by screw collar or " swivel couplings upon the service pipe at the front of the rising " board, it is always accessible for repairs when necessary."

According to another improvement, the inlet of the service pipe to the soil pan is at the side, "in order that the force of the " water may be rendered more effective in removing the soil."

[Printed, 6*d*. Drawing.]

A.D. 1862, June 30.—N 1905.

WALL, Joseph, and DODD, Thomas. —"Improvements in " taps for controlling the flow or passage of fluids."

An equilibrium tap is provided with four openings, one leading to the water supply, one to the pressure cistern, the third to the basin of the water closet, and the fourth for the valve spindle, which may be made tight by a stuffing box. The spindle is acted upon by a lever connected with the seat of the water closet; the valve upon the said spindle is a plain valve and "is capable of " being moved to and kept on one or other of two seatings, " between which it works." Closure of the valve against one seating shuts off the supply; closure on the other seating allows the water to flow into the pressure cistern and compress the air; when the valve again closes the supply, the water in the pressure cistern flows back into and through the tap to the closet basin.

In a tap for pan closets, the object is to shut off the supply gradually, and thus to give a sufficient supply of water to the container. A spindle valve, worked by a lever, has a seating between the inlet and outlet apertures. The part of the spindle beyond the valve is secured, by prongs, to a tube which fits, piston-like, into a space in the bottom of the tap. In rushing to the pan, a small quantity of the flushing fluid passes between the prongs into the tube, and, past a ball valve, into the said space. When the spindle is released, the ball valve closes the main water aperture. Small openings in the bottom of the hollow tube determine the time when the valve reaches its seating. This part of the invention is only set forth in the Provisional Specification.

In a tap for high pressure water supply, the valve is cylindrical, and is secured on the end of a horizontal valve spindle. A cap, secured to the longitudinal part of the seating, encompasses the valve; it (the cap) has small openings for the passage of the flushing fluid. When the float falls, the fluid passes; as soon as the float rises, the periphery of the valve is opposite to the water supply openings.

[Printed, 10*d.* Drawing.]

A.D. 1862, July 2.—N° 1932.

STEEL, JOHN.—(*Provisional protection only.*)—"Improvements "in waterclosets."

The bottom of the basin communicates by a short branch pipe with the discharge valve box, which forms the top of the soil pipe. The discharge a valve (an elastic flap) applies outwardly against the opening of the branch pipe, and has a brass ring for a valve seat. A plunger works up and down in the valve box by means of the rod of the pull handle, and is jointed to the valve, thus giving it motion. The plunger is guided by antifriction wheels, and is fitted with an antifriction wheel, by which, in descending, it presses on the valve and ensures its being properly closed.

"The water supply is made self-acting, the supply tap being "opened by means of a lever and float. The float is contained "in a compartment provided at the side of the basin, this com-

" partment communicating with the bottom of the basin or with " the branch therefrom, so that when the discharge valve is " opened, the compartment is emptied along with or immediately " after the basin, and the float descending in consequence opens " the supply tap, and the water flows in until the float is again " raised by the basin and compartment becoming full. An over- " flow outlet is provided, consisting of a small open pipe, ex- " tending from the bottom of the basin, or from the main dis- " charge branch up a little above the proper water level, and then " turning down into the valve box or soil pipe. This overflow " pipe is always sealed by the water in its lower part, and the " passage of smells from the soil pipe thereby prevented, whilst " as soon as the water in the basin reaches the level of the upper " bend it flows over, and passes into the soil pipe."

[Printed, 4*d*. No Drawings.]

A.D. 1862, July 10.—Nº 1992.

STEELE, DANIEL.—(*Provisional protection only.*)—" Improve- " ments in the method of flushing or distributing the water in " pans or basins, applicable to waterclosets, urinals, wash-hand " basins, or other purposes."

This invention relates to "improvements in the method of " distributing the water used in flushing, cleaning, or supplying " the pans or basins of waterclosets, urinals, wash-hand basins, " or other similar utensils, whereby the water is more evenly " distributed over the entire internal surface of such articles, " and any dirt or deposit left thereon is more effectually re- " moved." At or near the top of an ordinary basin the supply pipe enters, "and as it enters the basin or pan the aperture is " contracted so as to form a semicircle containing only about " half the area of the supply pipe; the effect of this contraction " is to cause the water to be delivered in a suitable manner and " at an accelerated speed into the distributing portion of the pan " or basin. The distributing portion is by preference formed all " in one piece with the pan or basin, or it may be made of china, " stoneware, metal, or other suitable substance, and affixed to " the top of the pan or basin in any convenient manner. This " distributor is made of the shape of the inside of the top of the " basin or pan, and is of the form of a portion of a pipe, the " *inner side* thereof being cut away, so that there is a narrow

" space entirely round the pan or basin between the portion
" forming the waterway or pipe and the basin. The water being
" let into the pan or basin by a valve, tap, or any of the methods
" commonly known and practised, fills or partially fills the tube
" or pipe, and passes out through the slot or space between the
" basin and the pipe, and the stream thus distributed spreads
" over every portion of the pan or basin."

[Printed, 4*d*. No Drawings.]

A.D. 1862, July 24.—N° 2105.

LEMAISTRE, Toussaint.—" Improvements in privies."

" This invention has for its object a continuous disinfecting
" ventilator applicable to the cesspools of privies, sewers, sumps,
" and other places where decomposed matters produce deleterious
" gases. This apparatus by a movement given by opening
" the doors of the closets, or by the fall of water, or by any
" other suitable power establishes a current of air."

The apparatus is composed of three principal parts.

The first part of the apparatus is a valvular arrangement at the lower part of the soil pipe. " Near the bottom of the soil pipe " just above the cesspool," is a weighted valve which closes it air-tight. The descent of soil on to the valve causes it to open, and as it opens (and also as it closes) a scraping blade is passed over its face, so as to prevent the adhesion of soil to the valve. An opening, ordinarily closed by a seat valve, gives temporary access to the weighted valve and scraper.

The second part of the apparatus is a clockwork arrangement to actuate a ventilating fan. A train of wheels to which motive power is communicated by weights, puts in motion a ventilating fan in an ascension pipe connected with the cesspool. Noxious gases are thereby drawn from the cesspool and discharged at the house top. The air to supply the vold in the cesspool descends the soil pipe.

The third part of the apparatus is a lock giving motion to the clockwork. The lock on the closet door is so arranged that the weight of the clockwork is wound up each time the door is opened. A pulley wheel, ratchet wheel, spring catch, and toothed rack are in connection with the spring bolt of the door, and with pulleys and draft cords belonging to the clock weights.

[Printed, 10*d*. Drawing.]

A.D. 1862, August 14.—N° 2286.

WHITE, George, BUCKLAND, Francis, and REES, Charles.—" Improvements in the manufacture of waterclosets."

The basin of the closet may be made of glazed pottery, earthenware, enamelled iron, or other suitable material, and is constructed with its bottom of a concave form " so as always to retain in it a " sufficient quantity of water. The basin is constructed nearly " of the same width at the bottom as at the top, and the sides " being thus nearly perpendicular to the water's edge are not " liable to be fouled."

" The outlet from the basin is made by an aperture at the side " at such a distance from the bottom as to retain the necessary " quantity of water, while the inlet admitting the water from the " cistern is placed opposite the discharge aperture, and the quantity of water admitted is regulated by a fan, so shaped as to " cleanse the basin thoroughly, by allowing a portion of the " water to be driven on each side of the basin, instead of being " carried with a spiral motion round it, as is usually the case; " whilst the bulk of the water flows across the bottom of the " basin into the discharge pipe."

The basin is trapped in the usual manner.

" The closet is so constructed, by means of a suitable combi- " nation of rods and levers connected with the seat and service " box as to be self-acting on every occasion of the closet being " used, and thus preventing the possibility of use without the " removal of the contents of the basin."

[Printed, 10*d*. Drawings.]

A.D. 1862, September 16.—N° 2536.

ASTEL, Edouard.—" Improvements in urinary utensils, also " applicable to fixed and portable commodes."

This invention " consists in the addition to chamber utensils " and similar vessels of an appendix having a special form for " each sex."

In the " chamber vase for the male sex," the circumference is not circular, but is provided in front with a projecting shoulder forming a species of " canal," the upper part of which is separated from the interior of the vessel by a partition slightly depressed towards the centre. A channel is prolonged to the bottom of the vessel to receive the urine.

The "vase for the female sex" "differs from that above des-" cribed in the additional height of the appendix and the sup-" pression of the canal and partition."

[Printed, 8*d*. Drawing.]

A.D. 1862, October 29.—N° 2917.

GEDGE, William Edward.—(*A communication from Jacques Germain.*)—(*Provisional protection only.*)—"Improved apparatus "in connection with the pans of water-closets."

"The inodorous water-closet pans or basins hitherto used are " subject as usually constructed to several disadvantages, such as " requiring frequent repairs to their gearing, and that the seat " should be pierced for the button or handle moving the lever " and valve or trap; I propose to fit on to the shaft of the trap " of the pan a crank connected by a rod with a lever, one end of " which is furnished with a counterweight to close the trap when " the foot is removed from the pedal, and the other covered by a " pedal of thin metal screwed to the flooring in order that it may " not catch in or tear clothes. On this the foot is placed to bring " the trap into action.

" For double-action pans a cock is seated on the shaft of the " trap, so that it and the trap open at the same moment."

[Printed, 4*d*. No Drawings.]

A.D. 1862, October 30.—N° 2933.

BIRCH, James. — (*Provisional protection only.*) — "Improved " apparatus for unstopping or clearing from obstructions drains, " water-closets, stack, water, and other pipes."

This apparatus consists of a series of tools adapted to the end of a jointed rod. Antifriction rollers, mounted on a swivel cross head, and the cross head mounted on a centre pin, enable the rod to be passed with facility by any projecting part of the tube or pipe to be cleared. The socket in which the centre pin is fixed " is screwed into the end of the jointed rod, which by the addi-" tion of one length after another may be extended to any length " that may be required." When the head of the rod has been forced through the obstruction, the water behind will soon wash it away.

When the obstruction consists of a collection of rags, or other fibrous substances, a screw formed something like a cork-screw is used. A screw, like the screws that are used for withdrawing the charges from guns, may be adapted, by screwing or otherwise to the end of the jointed rod. "When this instrument has been "screwed into the matted obstruction by turning round the rod "the obstruction may be removed from the pipe or drain by "withdrawing the instrument. This instrument will be found "useful for withdrawing from the valve boxes, traps and pans of "water-closets, any rags, paper, cloths, flannels, or such like "substances which may be accidentally thrown down the closet.

"For some kinds of stoppages and obstructions in water-"closets," the inventor employs "a plunger made of leather, "gutta percha, india-rubber, or other suitable elastic substance, "which when fitted to a short rod or spindle may be screwed "into the end of the jointed rod, and be employed to force for-"ward any obstruction by hydraulic pressure."

[Printed, 4*d*. No Drawings.]

A.D. 1862, November 5.—N° 2993.

BROOMAN, Richard Archibald.—(*A communication from Jean Louis de Waroquier.*)—"Improvements in commodes or "waterclosets."

"At the back or side of the basin is a water cistern, at the "bottom of this cistern there is a cylinder forming a pump "barrel, and in this barrel a piston with valves opening only "when the piston is raised is fitted; the outlet from this barrel "is fitted into a pipe opening into the basin. A rod is connected "to this piston and carries a handle which passes through the "cover of the cistern. Two studs are fixed on the piston rod, "between which the forked ends of a bent lever are placed; the "other end of this bent lever is connected through a link and "connecting rod to a shaft on which the valve at the bottom of "the basin is fixed. On raising the piston rod this valve is "opened, and at the same time water passes through the valves "in the piston and below it. On releasing the piston and allow-"ing it to descend by its own weight, or assisting its descent by "pressure, the valve in the bottom of the basin is closed, and the "water under the piston is sent by it into the basin."

[Printed, 8*d*. Drawing.]

A.D. 1862, December 16.—N° 3361.

THUDICHUM, John Louis William.—(*Provisional protection only.*)—"Improvements in collecting human excreta, and in "the apparatus and means employed therein."

The object of this invention is the preservation of the fæces separate from the urine.

The pan of a watercloset is divided into compartments, the fæces fall into one compartment and the urine into another; the former compartment opens into a drain pipe leading to the sewer, the latter, or front compartment, is connected by a pipe with a separate drain pipe (or "uroduct.") leading into a portion of the main sewer which is set apart for the reception of urine. The urine from other sources is collected in a urine can, and poured into a special sink whence it flows by a special pipe into the uroduct. "This can is provided with a sunk funnel-shaped " filtering lid or strainer, and with a handle on one side and a " spout on the other to facilitate the emptying of its contents, " and is further provided with a large hinged handle over the " top to carry it by." In those localities where water closets are not used, and where no system of sewerage is adopted, the inventor proposes "to substitute for the ordinary privy and " cesspool a receiving pan divided into two compartments by a " transverse partition, the front compartment which receives the " urine communicating by means of a pipe with a reservoir, tank " or carboy, whilst the compartment for the reception of the solid " excreta is provided with a hinged bottom, opened at will by a " handle. Into this compartment is introduced a small quantity " of dry or dried earth, or pulverised lime, or a mixture of those " substances, which together with the feces, descends into any " suitable receptacle below."

[Printed, 4*d*. No Drawings.]

1863.

A.D. 1863, May 1.—N° 1096.

JONES, Edward.—(*Provisional protection only.*)—"Improve" ments in drainage and in waterclosets, and in the means and " apparatus necessary for the same respectively."

"This invention has for its object a complete system of drain" age by a more durable construction of the drains, the collection " of the sewage and refuse matters, the preservation of the drains " from being choked up, and the utilising of the sewage, the

" raising and regulating of the necessary supply of water for " flushing the waterclosets and drains, the trapping, cleansing, " and ventilating of the sewers, and the relieving of them at " the outfall of low levels by the water being raised to higher " levels."

That portion of the invention which relates to water closets consists of "a new description of watercloset, trap, tanks and " valves, by which the water is allowed to flow off freely through " tanks where the sewage is retained, and the water allowed to " pass onwards, & filtered before it enters the drains. The " closet pan retains the water to a given elevation by a valve " fixed to a side opening in the pan, above which by an opening " left for that purpose just above the valve the waste water passes " off when the valve is closed." "Another method is by an " elbow pipe being attached to the opening in the side of the pan " by a flexible joint to allow the lower branch to descend when " the apex of the elbow is so lowered as to allow the pan to be " emptied and flushed out." Two small portable tanks, one for the sewage the other for the deodorising material, are fixed beneath the closet. A peculiar closet service valve is used, "which opens " and shuts against the end of the service pipe within the fan of " the closet pan by which no leakage can ever occur outside of the " pan."

[Printed, 4*d*. No Drawings.]

A.D. 1863, May 5.—N° 1118.

CHESSHIRE, Edwin.—"Improvements in apparatus for intercepting the solid portions of the soil of waterclosets."

An intercepting reservoir or catch pit is placed in the course of the soil pipe passing from the water closet to the main sewer. This reservoir may be made of metal, stone, slate, wood, or other material; if made of a non-metallic substance, it is puddled externally; it is made air-tight, except through the soil pipe above and the drain pipe below. The drawings show a rectangular reservoir made of wrought-iron plates. The reservoir is provided with handles, by which it can be removed for emptying, and is covered by a tight-fitting lid. At one of the corners of the reservoir is a curved vertical perforated plate or grating. The soil pipe is passed through the connecting piece carried by the lid. *The sewer pipe* passes through a connecting piece and opens into the grating. Either or both of these pipes "may be provided " with syphon traps near the catch-pit to prevent the regurgitation " of offensive gases from the sewer." The contents of the water closet or closets received, by the soil pipe, into the reservoir, are separated into two portions, the solid portions being intercepted by the vertical perforated plate or grating, and thereby retained in the reservoir, while the liquid portions pass through the grating into the sewer. A screw plug in the lid enables the quantity of soil to be gauged.

In another kind of reservoir, the gratings may proceed across the vessel, an inclined perforated plate may be used instead of a vertical one, and a false perforated horizontal bottom may be employed.

[Printed, 8*d*. Drawing.]

A.D. 1863, May 25.—N° 1310.

LEPROVOST, Paul.—" Improvements in carriages and vehicles " for railways and other roads."

These improvements are:—

1st. "The construction of railway carriages and other vehicles " chiefly of sheet iron, and with an external or internal passage, " either nearly all round the outside or in the interior of the " vehicle."

2nd. "The construction of railway carriages with a spiral staircase for ascending to the top of the vehicle, and in making use " of the top for carrying passengers."

3rd. " Providing a watercloset for the convenience of the passengers," together with certain other arrangements.

" Each carriage is divided into three compartments, communicating with each other by means of sliding doors. In " the passage at the end of one of the outer compartments," the inventor constructs " a watercloset for the use of the passengers. This compartment has, in addition to the entrance door " placed at the end of the carriage, a side entrance door facing " the station, the steps of which are raised and lowered by the " opening and shutting of the door."

[Printed, 10*d*. Drawing.]

A.D. 1863, June 20.—N° 1552.

MACAULAY, Henry.—(*Provisional protection only.*)—" Improvements in covers or appliances for the rims, borders, or

" top edges of chamber utensils, applicable also to commodes and " waterclosets."

"The object of the invention is to preserve the heat of the " body, and to defend against cold, thus conducing to the health " and comfort of children, invalids, and others, especially during " the cold seasons of the year.

"The covers may be made either firm or pliant. When firm " they may be made of paper, papier maché, caoutchouc, gutta " percha, wood, or mixtures of them, with or without an adhesive covering of some soft material; or of thin sheet metal, " as of brass, copper, or tin, with an adhesive covering of soft " material, as of wool, cotton, silk, in any suitable process of " manufacture, or of similar imperfect conductors of heat. " When pliant they may be made of woollen, cotton, silk, " linen, or mixtures of them with or without caoutchouc, or " gutta percha, and being either woven, felted, knitted, braided, " or otherwise manufactured, and have in every case a curtain " attached, or not, as desired. They may be made to fit, " when firm either on the top of the vessel downwards, the " inner edge of the cover descending about half an inch inside " the utensil, and about an inch or more, as required, outside of " it, or they may fit edgewise on the rim by the elasticity of the " material used, or by an elastic or other joint or spring.

"For water-closets they are made firm to surround the inner " edge, and spread out more or less over the seat."

[Printed, 4*d*. No Drawings.]

A.D. 1863, July 10.—N° 1722.

SHEDLOCK, James John.—(*A communication from Adolphe Kolb and Théodore de Lévenhagen.*)—(*Provisional protection only.*) —"Improvements in the construction of soil-pits, and in the " mode of emptying the same."

"This invention relates to improvements in the construction " and mode of emptying privy and other soil pits."

The drawings represent the pit with lining and vault in masonry. The soil pipe enters the upper part of the pit. Two conduits lead away from the side of the pit; by means of these conduits or pipes, the gases disengaged in the pit are carried to a flue. To empty the contents of the pit into a cylindrical tank on wheels, a pump is connected with the tank by a pipe, and with the pit by another pipe. The vault has three openings (covered by a plate or flagstone); one serves as a man-hole, the second gives passage to the suction pipe of the pump, and the third to a tube, which carries back to the pit the gases disengaged in the tank during the emptying of the pit. The tank has also a gauge and a discharge orifice.

"By application of the above improvements we obtain a perfect " aeration of the pit and consequent suppression of mephitic " emanations even during the process of emptying while dis- " pensing with the use of water and disinfectants."

[Printed, 6*d*. Drawing.]

A.D. 1863, July 20.—N° 1818.

WEARE, Robert.—" Improvements in waterclosets, commodes, " slop pails, and other like apparatus or utensils."

Inside a cylindrical vessel, which has a rim turned down inwards from the top edge, a second vessel is placed, leaving a jacket for water between the two. A funnel is suspended inside this second vessel, the orifice in the said funnel being about two or three inches from the bottom of the second vessel, which is filled with water until the water rises about half way up the funnel. " A dome or other shaped lid, flanged like a common " saucepan lid, fits over both the funnel and the second vessel, " the flange entering the water in the jacket space, and thus " acting as a D-trap in preventing the escape of effluvia." For bed pans, a slipper or wedge-shaped part is attached to the appa- " ratus above described, " to admit of the utensil being easily " and gradually passed under the body of the patient;" the utensil is thereby able to be made more shallow than it would otherwise be. " Slop pails may also be made upon the same " principle of the double vessel, and either with or without the " funnel."

The drawings show a utensil and slop pail constructed according to the above description; this form of apparatus may also be used, in a smaller size, as an expectorating pot. The same apparatus, with a cistern fixed to the back of the chair, is applied to a night chair; water is conveyed into the funnel by means of a flexible tube attached to a tap on the cistern. A bed pan, as described above, is also shown.

[Printed, 8*d*. Drawing.]

A.D. 1863, July 23.—N° 1843.

SOUL, Matthew Augustus.—(*A communication from John Palmer.*)—"Improvements in expelling solid and liquid refuse "matter from steam and sailing ships below the water line, "applicable also for discharging cannon below water from ships "and forts, and in part for charging gas retorts and iron furnaces, "and for other similar useful purposes."

The principle, the application of which constitutes this invention, consists in depositing the material to be disposed of, under unequal pressure (of water or air for instance) into a receptacle, the said receptacle (by means of certain mechanism) being put alternately into operation by means of the said unequal pressures.

To get rid of the ash or refuse of the furnaces of a steam ship, a water-tight tube, or receptacle, is attached to the ship's hold, below the water line. This receptacle has two valves, one opening towards the interior of the ship, the other towards the exterior. When the receptacle is supplied with pneumatic pressure by means of a steam pump, the water is depressed, and allows the substances to fall by their own weight into the sea so soon as the external valve is opened.

These improvements are applied to discharging the contents of water closets that are below the water level of a ship.

The basin of the water closet constitutes the receptacle; it has a lid which can be closed hermetically by a clasp. The pan valve works on an axis, and is ordinarily kept closed by a counterweight; it communicates with a secondary vessel, in which there is considerable pneumatic pressure, that opens into the sea. The valve is opened by a lever, and there are packing rings to ensure water-tight closing of the cover and valve. Openings in the pan and in the secondary vessel, communicate with the pneumatic apparatus. The mode of working is described in reference to the ash apparatus.

Other applications of this invention are set forth.

[Printed, 1*s.* Drawing.]

A.D. 1863, July 29.—N° 1880.

BONNEVILLE, Henri Adrien.—(*A communication from Louis Melotte.*)—"An improved self-acting 'flushing' ap-"*paratus.*"

The apparatus which form the subject of this invention are "intended for sluicing urinals and sewers."

The drawings show a rectangular cistern with floats and a syphon. When the water has risen to a certain height, a projection on the rod of one of the floats presses againt the lever of the valve that otherwise keeps the passage to the syphon closed, and opens the said valve, thus emptying the cistern. Although the float descends, the valve is kept open by a lever or tail piece until a projection on the second float disengages the tail piece from the valve lever; this disengagement can only happen when the float has descended to a certain point and therefore when the water has nearly run out.

Another apparatus is described only in the Final Specification; it may either be used alone or in conjunction with that described above. A basin or bucket is mounted on an axis, so that when there is no water in it, the side opposite the lip is the heaviest, but when water has entered it to a certain height, the other side becomes the heaviest, and the basin empties itself by turning over. As soon as the basin is empty, it rises again. Fixed cross pieces act as stops and regulate the degree of filling that the basin may have as well as its turning over. There is an inside partition in the basin which leaves only a certain passage for the water, and prevents the basin in turning over from striking too violently on the cross piece. The basin is placed in a reservoir which has a discharge tube.

[Printed, 10*d*. Drawings.]

A.D. 1863, September 2.—N° 2170.

CORLETT, CHARLES HARVEY.—"Improvements in valves, "taps, or cocks."

The said articles are used (among other purposes) for public urinals "so as better to prevent the same being obstructed by "frost." For this purpose the valves are constructed with three openings instead of two; the three openings are, one inlet and two outlets. "The object of this second outlet is to let the water "run off which remains above the valve, tap, or cock after the "inlet is closed; this second outlet being kept closed during "the time the valve, tap, or cock is being used for supply, but "opening simultaneously as the inlet closes, and *vice versâ*." "Thus no water remaining in any of the above-named apparatus "after use they cannot become obstructed by frost."

The drawings show arrangements that are suitable to public urinals. The outer case of the valve has three openings, one that is horizontal for the inlet, a second that is joined to a vertical pipe for the outlet and delivering into the basin of the urinal, and a third (bolted on to the outer case) which lets the water off that remains above the valve and is called the waste pipe. The valve itself is double-faced (front and back) and is fitted on to a spindle which passes through a stuffing box; the valve is moved up to one seat or the other by turning its screwed spindle slightly in one direction or the other. A weighted lever attached to the spindle, works the valve, a foot plate being attached or linked to the other end of the lever. When any one treads on the foot plate the inlet is opened, the outlet for the waste is closed, and the water flows to the basin of the urinal.

When the foot plate rises, the weight on the lever causes the spindle to turn and the valve to close the inlet and open the waste pipe.

[Printed, 2*s*. 8*d*. Drawings.]

A.D. 1863, September 7.—N° 2198.

YORK, JOSIAS BULL.—"Improvements in privies or closets "to be used in place of waterclosets."

By these improvements "the soil of the said privies or closets "is deodorized and preserved in a solid form, and thereby made "into a valuable manure."

According to one arrangement, an annular trough fixed on a vertical shaft at the back of the pan, conveys away the soil into such a position that it can pass down a delivery pipe into a chest or other receptacle. The partial rotation which is given to the trough, after the closet has been used, also enables sand or ashes to be so placed that the soil can fall upon them at the next time that the closet is used, the said sand and ashes being contained in a hopper at the back of the closet. The said annular trough may be with or without compartments, but it must have hinged doors which are caused to open (by means of spring catch fastenings) when they arrive over the delivery pipe.

According to another arrangement, the vertical shaft carries not less than two horizontal arms, each arm terminating in a shallow pan. "In using the privy or closet the soil falls through

" the fixed pan of the seat into the shallow pan forming a " temporary bottom, and is received on the ashes in the said " shallow pan." By means of a winch or lever, a partial rotation is given to a vertical wheel that has the same number of cups as there are shallow pans; the rotation of the wheel causes each of the cups to be be filled with ashes as it passes the mouth of a hopper, and descending through a half rotation of the wheel, empties itself into one of the shallow pans. The vertical shaft is geared to the vertical wheel, so that the said vertical wheel and the shallow pans rotate simultaneously. When one of the shallow pans arrives over the delivery pipe, a spring catch fastening disengages its bottom, which lets the soil and ashes fall. As the pan rotates further, the open bottom is raised by means of a fixed incline.

Other modifications are mentioned.

[Printed, 10*d*. Drawing.]

A.D. 1863, September 9.—N° 2218.

YORK, JOSIAS BULL.—(*Provisional protection not allowed*).— " Improvements in privies or closets to be used in place of " water-closets."

By these improvements " the soil of the said privies or closets " is deodorized and preserved in a solid form and thereby made " into a valuable manure."

The pan of the closet may have a division near its front, by which the urine may be conducted from the pan separately from the soil. A vertical shaft at the back of the pan carries an annular trough having radial compartments, each of which can be brought under the pan by the rotation of the shaft, and thus form a temporary bottom to the said pan. A reservoir at the back of the seat, opening over the trough, contains sand or ashes, which, by the rotation of the trough, is supplied, in succession to the compartments as they arrive under the reservoir.

After the closet has been used, a partial rotation is given to the vertical shaft, thereby removing the compartment containing the soil from under the fixed pan, and emptying it. At the same time another compartment with its charge of sand or ashes is brought under the fixed pan, so as to be ready for another occasion. An empty compartment is simultaneously brought under the hopper and receives its charge of sand or ashes. The emptying of the compartment charged with sand and soil is accomplished by unfastening its hinged bottom, its spring catch striking against a fixed stop; the sand and soil are delivered into a chest and as the discharged compartment rotates, its bottom is closed by means of an incline.

[Printed, 4*d*. No Drawings.]

A.D. 1863, September 29.—N° 2392.

LLEWELLIN, Peter, **LLEWELLIN**, John, and **JAMES** John Wanklyn.—"Improvements in water-closets."

This invention "consists in actuating the valve for discharging " the contents of the closet by means of a spiral slot, worm, or " screw thread carried by a rocking or rotating spindle and " acting upon a tail-piece or short projecting arm on the axis of " the valve. This slot, worm, or screw thread, is made by preference of a quick pitch changing at the end of the travel to a " slower pitch, so as to press the valve tightly against its seat, " which consists of an india-rubber collar fixed to the cover of " the container just under the lower lip of the basin holder, which " is bolted down thereon, or in lieu of the basin holder and " cover being made separately and bolted together they may both " be cast in one piece, and the collar placed inside the container, " a spring or weight is made to turn the valve-actuating spindle " so as to keep the valve closed, and a handle on the spindle " serves to open the valve when requisite. A wash waterway is " made in the basin holder, and in some cases this waterway is " continued down and made to dip into a cup in the container, " so as to form a hydraulic seal, and so prevent any effluvia from " rising into the closet from the drain."

The drawings show one apparatus in which the valve-actuating spindle is vertical, the valve being kept up to its seat by a spiral spring, and being worked by the partial rotation of the water closet handle. In another apparatus, the valve-actuating spindle is horizontal and is kept up to its seat by a counterweight; the pulling up of the water closet handle works the valve.

[Printed 10*d*. Drawing.]

A.D. 1863, October 5.—N° 2432.

TOMLISON, Charles.—(*Provisional protection only.*)—"Im" *provements in taps,* cocks, hydrants, or valves, and apparatus

" connected therewith, for opening, closing, regulating, and " facilitating, and otherwise controlling the passage or flow of " water, air, steam, gas, and other fluids and liquids."

"These improvements may be used for baths, water-closets, " urinels, fountains, and all other purposes requiring the same."

A tap is constructed "which opens and closes by the motion " of a valve or plug; the valve or plug is governed by a wedge " or conical ended stem being screwed or pressed or otherwise " moved on to the valve or into a hole or recess on the valve in " such manner that the valve is opened or closed by the movement of the stem."

A second valve may be added to the above-described tap, so as to enable it to be repaired without shutting off the pressure or emptying the pipe through any other means than the action of the first valve.

Another application of this invention "consists in applying a " bar of wrought iron or other material with a screwed spindle " moving through a similar screw in the bar, both being used " for opening, closing, and governing the passage of the air " cock or hydrant, known as Bateman and Moore's Patent, No. " 12,032, dated 1848."

Other portions of this invention are described at length.

[Printed, 4*d*. No Drawings.]

A.D. 1863, October 17.—N° 2539.

SHANKS, John.—" Improvements relating to watercloset and " other valves or taps."

In an arrangement "adapted to water closets, the closing " detail consists of a ball of vulcanised rubber made hollow, but " wholly or partially filled with a liquid, such as water, or with " loose materials such as sand, introduced to impart a certain " amount of solidity to the ball, but still permitting the external " surface to adapt itself accurately to the valve seat; this valve " detail works in a pipe or passage, which is by preference vertical, the discharge duct from the closet basin entering it laterally " just above the valve seat. The valve is opened by a lifting rod " carried vertically upwards, and to prevent papers getting into " the upper part of the vertical pipe, there is fitted above the " ball a perforated shield, which may or may not be lifted with " the ball. As a further protection, a flap of vulcanised india-rubber is applied to the side opening in the pipe."

It is preferred to determine the water level by a ball float, in a small compartment in connection with a side passage which is formed with an overflow duct. This overflow duct is made syphon-fashion, and so as to be trapped; "but as the lodgement " of air in the upper part of it would prevent its acting on the " water reaching the predetermined level," a small float valve is provided, which is opened by the water when it rises.

Other applications of the above-described valves or taps are alluded to.

Another portion of this invention relates to opening and closing valves or taps by means of a loose key.

[Printed, 8*d*. Drawing.]

A.D. 1863, October 22.—N° 2598.

FRIEND, John Walter, and WEATHERDON, Baldwin Fulford.—" An improved valve and valve gear for regulating " the passage or flow of fluids."

The object of this invention is the obtaining a uniform regulation of water to water closets under all pressures, and it consists, firstly, in placing the valve below the supply, so as to lift against the pressure and maintain the same when closed firmly upon its seat; secondly, in separating the tubular case or cylinder through the medium of a division plate, for the purpose of preventing the force or flow of water acting on the regulating piston; thirdly, in the employment and application of the said regulating arrangement to the ordinary taps and closet gear for gradually cutting off or checking the supply of water by the descent of the piston or plunger moving within an outer case or cylinder charged with quicksilver.

[Printed, 8*d*. Drawing.]

A.D. 1863, October 31.—N° 2708.

JONES, Edward. — " Improvements in the manufacture of " bricks, drain pipes, traps, sewage tanks, and watercloset pans " and valves, and the machinery or apparatus necessary for the " same."

The second part of this invention relates " to a new descrip- " tion of closet pan and valves, drain traps, and sewage tanks. " The closet pan is so made as to receive the valve at the side of " *the pan, which* when closed will allow the water to flow off at

“ any given level above the valve, so as effectually to trap the
“ pan, and the service valve is so made and fixed to the pan as to
“ be acted upon within the fan of the closet pan by a special
“ formation of the pan to this end. Beneath the closet pan a
“ double trap is fixed, the one to receive the contents of the closet
“ when used, the other to be always open for waste water to pass
“ off. Beneath the first trap, covered with a sliding door (which
“ when open closes the second trap), I fix a tank with suitable
“ divisions and filtering media to receive the sewage, and the
“ water being filtered passes into a second tank of similar de-
“ scription filled with deodorizing matter, by which the water
“ is filtered and purified and allowed to pass into the drain.
“ In cases where the supply of water to the pan is limited, as
“ in portable waterclosets or commodes, a bag composed of im-
“ pervious flexible material may be used to contain the water,
“ which when compressed by leverage or other means will force
“ the water out to flush and clense the pan. The sewage tanks
“ are so fixed as to be easily removed for emptying or renewing
“ without any smell or taint of the atmosphere.

“ Another description of closet pan is by an elbow pipe being
“ attached to the opening in the side of the pan by a flexible
“ joint, to allow the lower elbow branch to descend, by which
“ the apex of the elbow is so lowered as to allow the pan to be
“ emptied and flushed. The lower part of the elbow is so formed
“ as to fit closely in the trap below, and when elevated it forms
“ a close air-tight joint or countervalve against the collar of the
“ trap, and at the same time the pan is trapped.”

[Printed, 8*d*. Drawing.]

A.D. 1863, November 11.—N 2801.

READE, Thomas Mellard, and HEWITT, Joshua.—“ Im-
“ provements in the apparatus for regulating and controlling the
“ supply of water to waterclosets, and other purposes.”

This invention consists mainly in the use of a measuring supply
service box provided with a self-acting floating ball valve, “ and
“ in the application of a vertical syphon pipe connected with the
“ bottom of the measuring box in the case of pan or valve water-
“ closets, which require an ‘after supply’ for the purpose of
“ trapping or preventing the effluvia escaping from the soil pipe,
“ and so arranging the apparatus when applied to hopper water-

" closets as to make available the elasticity of a given quantity " of air confined within the service box, or in a chamber placed " above it, for securing the more effectual flushing of the pan; " and, lastly, in an improved supply valve for the service box and " its gear, which are equally applicable to a high or low water " pressure service or supply."

In an application of this service box to a pan closet, the drawing up of the handle causes the box to fill, and the syphon to discharge itself into the basin; the depression of the handle closes the supply valve, and the contents of the box then go into the basin. A measuring box with an air pipe may be applied to a cistern; a small perforation enables the water to enter the box, and it is drawn off therefrom through a large pipe. In a pneumatic measuring box for high pressure service, the entrance of the water compresses the air, closes the valve, and the water runs off through the syphon flushing pipe. In a hopper water closet, the depression of the seat opens the supply valve, the entrance of the water closes the air valve until the water rises to the highest point of the syphon, when it runs through; on the rising of the seat, the supply valve closes, the air valve drops, and the contents of the box are delivered through the syphon. In the service box to another hopper water closet, the air pipes are dispensed with by means of a rising service pipe. In another service box there is an air valve at the top, a supply pipe at the side, and a syphon rising upwards from the bottom of the vessel; this vessel fills and empties itself alternately. A lift valve is described and shown which has a stem, and is acted upon by the supply pipe from underneath.

[Printed, 1*s*. Drawing.]

A.D. 1863, November 13.—N° 2835.

GEYELIN, George Kennedy.—" Improvements in the con- " struction of waterclosets."

" The back part of the closet pan is made at right angle or to " recede from the top to the bottom, which prevents the soil " falling on it. A steep inclined plane forms the bottom of the " valve or syphon watercloset, down which incline the soil slides " and can only rise again to the surface of the water on the " outside of the pan, where it is hidden from sight." A claim *is made for, 1st,* the construction of oblique water closet pans, with the back receding at any angle, " which pans are adapted " to the syphons and valves in present use"; 2nd, the construction of syphons with an inclined plane adapted for the oblique or common pans; 3rd, the construction of oblique valves, adapted to the oblique common pans.

[Printed, 4*d.* No Drawings.]

A.D. 1863, November 16.—N° 2865.

CAMERON, SAMUEL, and JOHNSTON, WILLIAM.—" Im- " provements in taps or valves, in pipe joints, and in the valvular " mechanism of waterclosets."

In a tap, used in connection with a ball float for a water closet, the body in which the plug works "is made in two halves like the " half bearings of a shaft, one half bearing being formed on " the water inlet piece, and the other in a cap, which is fixed " to the inlet piece by flanges and screws after the plug or valve " piece is placed in position." The water " enters the plug " through a slot in it and another in the inlet piece when the " plug is turned to make these coincide, and the part round the " inlet slot is lined with packing." The extremity of the lever of the float is made tubular, and being fixed on the plug, the water is discharged through it. In a modification of this tap, the angular motion of the tubular lever (by means of a pin and inclined groove) " causes the inner end of the tube to close " against a seat covered with leather or rubber."

The discharge mechanism of a water closet is made like the above described tap, but on an enlarged scale, " and the axis of " the valve piece may be vertical, inclined, or horizontal. The " plug of the water supply tap may also be constructed in the " same way, and it may be fixed on the same axial spindle as " the main discharge valve." A flap valve with a vertical face may be used as a discharge valve. Overfilling the basin may be prevented by attaching a tube to the valve itself and carrying it up to the requisite height inside the valve chamber. " In another " modification a curved pipe is fitted on the basin discharge in " such a way that when it is turned upwards the overflow by it " is at or above the level at which the water is wished to stand " in the basin. The discharge is effected by turning down the " curved pipe."

[Printed, 10*d.* Drawing.]

A.D. 1863, November 26.—N° 2973.

SIMMONDS, James.—" Improvements in stink traps for water-
" closets, sinks, and other purposes."

" A D-trap for instance, I make of cast-iron, and at or near
" one extremity, and at the overflow end I raise a neck piece
" some three or four inches which is furnished with a suitable
" cover; from this cover I carry up the air pipe. The trap is
" fixed in such a position that this neck rises above the floor,
" and is level with the upper surface thereof." "The waste pipe
" or also the neck piece, I make in the form of short extensions
" by the casting with flanges upon them, with which the cover
" in the one case and the waste or soil pipe in the other can be
" readily united." "Traps for sinks I form of cylindrical, square,
" or other form, but without a fixed flange at top. The interior
" of the vessel has a division dipping below the spill water or
" overflow, and cutting off the air and space of the one-half of
" the vessel from the other, as usual. The spill or overflow
" passes off from the vessel at the side, the channel being formed
" exterior of the body of the trap. The dividing partition unites
" with the side of the vessel by an inclined diaphragm covering
" in the overflow. In this inclined part of the partition or
" diaphragm I form a neck piece and cover, which can be removed
" and access so had to the overflow waste pipe." " In fixing this
" trap, it having no fixed flange, I push it up from below, and
" drop a cupped flange on it from above, and fix it by screws
" or other fastenings, and upon this again I screw down or
" otherwise fit the grating of the trap."

[Printed, 8*d*. Drawing.]

A.D. 1863, November 28.—N° 2991.

CORDON, Charles.—(*Provisional protection only.*)—" Im-
" provements in means or apparatus for supplying water to
" waterclosets and urinals."

"The improvements apply particularly to cases in which the
" cistern for supplying water to a watercloset is provided with a
" flushing chamber, and in which there are consequently two
" valves, one of which is required to be kept closed except when
" the other valve is acted upon for flushing; and the object is to
" obtain simplicity in the arrangement of the parts working the
" *the valves. For this* purpose the valves are connected to the

" ends of arms formed on the opposite sides of an axis, which is " weighted on that side to which the valve is hung, which is " generally required to be kept closed; and the weight is pro- " vided with a stop, which by resting on the edge of the cistern " regulates the depth of its descent; and this stop is covered " with india-rubber or other suitable elastic substance to prevent " noise and reaction. The arms, axis, and weight are by pre- " ference formed in one piece, and the axis is at one end pivotted " to pass into a hole in a projection rising above the one side of " the cistern, whilst the other end of the axis is provided with a " neck to rest in a recess formed in a corresponding projection " rising from the opposite side of the cistern. Similar apparatus " is also applicable to urinals, as also to cisterns where one valve " only is used, but in that case one arm only would be required " to the axis, and that on the weighted side of it."

[Printed 4*d*. No Drawings.]

1864.

A.D. 1864, February 15.—N° 385.

DENCE, John.—(*Provisional protection only.*)—"An improved " combined watercloset and urinal."

The principal feature in this invention is that the seat of the " combined watercloset and urinal is attached by a pivot hinge " or joint, so constructed and arranged by self-acting mechanical " means that a person cannot approach it without finding the " seat in a vertical position, the closet being then ready for use " as a urinal, and if he requires to use it as a seat he can with " ease close the lid or seat and use it for that purpose."

The following are the methods by which the invention is carried out :—

1st. A seat is employed "that works on a pivot hinge or joint " at the back or sides with an arm or lever having a counter- " balance weight attached, so adjusted that the weight shall be " just sufficiently in excess of the weight of the seat as to keep it " in a vertical position, and yet not so much so but that the seat " may be easily pressed down for use."

2nd. In some cases, the same object is secured "by means of a
" spring instead of a weight."

3rd. In some cases, a mechanical arrangement is so connected with the door of the closet "that any person opening the door
" sufficiently wide to enter, by so doing raises the seat to a vertical
" position, in which it remains ready for use as an urinal unless
" lowered by hand for use as a seat."

4th. In other cases, in front of the seat a platform is employed,
" on which any person must tread who comes near enough to
" make use of the closet. This platform is connected by a simple
" mechanical arrangement to the seat, so that any person treading
" on it thereby raises the seat to a vertical position, but can easily
" press it down if requiring to sit on it."

This invention, "in one or other of the forms herein described,
" can be adapted to any existing form of closet."

[Printed, 4*d*. No Drawings.]

A.D. 1864, April 16.—N° 958.

NICHOLSON, JOSEPH ALFRED.—(*Provisional protection only.*) —"Improvements in water-closet apparatus."

1st. Fitting the tumbling pan on its axis and to the bottom of the earthenware pan so that it may be emptied by inverting it, the axis being diametral to the pan. The tumbling pan is large enough to contain the flow required at each time. The bottom of the earthenware pan does not dip into the tumbling pan, but the earthenware "is cupped to permit of the tumbling pan, which is
" somewhat of a semi-globular form, fitting as closely as possible,
" at same time permitting of its necessary motion; the axis is
" situated just below this point." A crank arm is fitted on the spindle carrying the tumbling pin; from the said crank arm the pull rod is conducted upwards. A D-trap prevents effluvia returning from the drains into which the closet empties.

Modifications of this apparatus are mentioned.

2nd. "Means of keeping the pull handle up, and the water
" running for a certain length of time at each pull of the handle."
The pull rod is connected with a projecting pin; "this pin in
" rising passes up a straight slot in lifting the handle, but when
" released is so arranged that it must pass down a series of inclined
" surfaces, disposed for convenience in a zig-zag direction, which
" *occupies a given length* of time to traverse, and so retards the

" descent of the pull handle, and prolongs the flow of water. " These reversed inclines being in two, three, or more stages the " pull handle may be lifted only to one, two, or more divisions, " and the descent prolonged in proportion. Instead of being " arranged in a zig-zag direction the inclined retarding surface " may be helical and on an axis, which will rotate in frictional " contact, or provided with a flyer to retard its motion in the " requisite degree."

[Printed, 4*d*. No Drawings.]

A.D. 1864, April 25.—N° 1043.

SYMES, James.—" Improvements in urinals."

By these improvements "the offensive odour given off by ordi- " nary conveniences of this nature will be obviated, and a clean " and inodorous urinal substituted." In lieu of the ordinary slate or other cells, partitions, or basins, applied in the construction of urinals, a series of parallel divisions are constructed within the walls of the urinal. These divisions rest on the floor, and are " held in position by an iron bar or bars passing through them " and the walls, and by a cross piece at the top of the urinal. " Beyond or in front of these divisions and beneath the level of " the floor is a reservoir of water, into which the urine falls direct, " without coming in contact with any fixed portion of the urinal. " Water is supplied from a pipe above the reservoir, and removed " by a waste pipe. The water may be continually kept in a " flowing state, or it may be periodically let off and supplied " according as the urinal is greater or less frequented." Where water is scarce, a slope is given " to the bottom of the reservoir, " so that no deposit could remain; in such case lime or other " purifying matter may be applied to the reservoir, which should " be occasionally flushed with a bucket of water."

[Printed, 8*d*. Drawing.]

A.D. 1864, June 7.—N° 1416.

BECK, John. — " Improvements in water-closets, lavatories, " urinals, valves, and stench traps."

" My improvements consists, firstly, in connecting the closet pans " to each other by pipes, supported when necessary on suitable " standards, so that the spaces between the closets may be made " of any suitable width or distance.

" Secondly, in attaching at one end a suitable feed cistern for " supplying water to the pans, which may either fill the pans to " the level required, or may allow of a constant flow of water " through a trap valve."

" Thirdly, in the application of a sliding valve fitted to end " of discharge orifice on the outside, so that the only part of " the valve in contact with the soil becomes scraped on being " withdrawn, and thereby kept efficient. This slide valve may " also contain a trap to allow of a continuous flow of water " through the same, and to prevent the stench escaping.

" Fourthly, in introducing a door in the trap of closets, so that " any obstruction may be removed without disturbing the pan or " any of its fittings.

" Fifthly, in the application of the before-mentioned improvements to lavatories and urinals, so that the contents of the " whole range or series can be discharged at once, and that a " stream of water may if required, be kept constantly flowing " through the series, in order to keep the soil or urine in a state " of dilution till discharged by the withdrawal of the valve."

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1864, June 28.—N° 1616.

THOMSON, THOMAS, and MURRAY, JOHN. — "Improvements in means or apparatus for supplying water to water-" closets and other places in regulated quantities, which improvements are also applicable to measuring the flow or passage of " fluids, and part of which improvements is also applicable in the " construction of cocks or taps."

The supply water flows from into a chamber through passages capable of being closed by a sliding cover. To the chamber is affixed a cover controlling outlet passages in communication with the closet pan or place to be supplied. "The sliding of the " chamber in one direction admits water therein, whilst the air " escapes by a float valve from this chamber until it is filled with " water, and then the water acts on this float valve to close it, " and retain the chamber filled. But on moving the chamber in " the opposite direction the inlet passages for the water thereto " are closed, the air-valve and the outlet passage for the water " are opened, and the waters flows from the chamber, and so on. " *The size of the* chamber is the measure of the quantity of

" water employed each time of action, and as such the apparatus " may be employed with a suitable index to indicate the times of " motion for measuring water." "The chamber may be sta- " tionary, and the sliding motion be given to internal supply and " outlet tubes, or cover or other valves may have motion given " to them simultaneously through the chamber.

" By one valve arrangement employed by us, holes are formed " in concentric tubes, one to slide in or upon the other, and the " passages through them are opened by the holes of one being " brought over or coincident with those of the other.

[Printed, 8*d*. Drawing.]

A.D. 1864, June 29.—N° 1622.

WILSON, John Hays.—" Improvements in portable water- " closets peculiarly applicable for use on board ships."

The water closets comprised in this invention are made in one piece, and in such a manner that the pan, cistern, valves, and other parts thereof can be removed as a whole; when connected to a soil pipe the closet is ready for use. The pan is placed on suitable rests and the supply cistern springs up from the upper edge of the back of the closet pan. Both pan and cistern may be ornamented, and the cistern forms an easy back to the closet seat. Upon pressure being applied to the jointed closet seat, it raises the outer end of a curved arm, which actuates the valves, by means of a cranked arm, so as to close the exit valve on the underside of a measuring box and to open the inlet valve. When the seat rises (by the action of a counterweight), the inlet valve is closed and the exit valve allows the measured quantity of water to flush the basin or pan. The soil pipe is fitted internally with a valve to prevent an up current of air or water; this valve is made of india-rubber and is secured in position by a flange; it is folded so as to close when pressure is not applied from the interior. The upper portion of the seat may be turned upwards and backwards so that the closet may be used as a urinal.

The drawings show a closet worked by a handle, in which, besides actuating the valves of the supply cistern, the rod of the handle operates a double-faced valve that is mounted on an axis and alternately closes the bottom of the closet pan and the head of the soil pipe.

[Printed, 1*s*. Drawings.]

A.D. 1864, June 29.—N° 1627.

LAVATER, Manuel Leopold Jonas, and NIBLETT, Edward William.—"Improvements in waterclosets and urinals."

According to this invention, waterclosets are arranged so that the wash water passes away by a separate pipe to that by which the solid matters pass away; or, both the solid and fluid matters may be separated from the wash water. In the case of the separation of the fæces and urine from the wash water, the bottom of the pan is closed by a valve turning on a hinge at one side of the pan; through the centre of this valve is an opening closed by another valve opening outwards, which conveys away the water. The central valve is connected by levers to the seat, so that when it (the seat) is depressed, the central valve opens, the water flows away into its particular channel, and the central valve closes. When the seat rises, the whole pan valve is opened by means of a closet handle, and the solids and fluids in the pan fall into a passage appropriated to them. When the handle is lowered, the wash water flows into the pan and remains there until the seat is again depressed. When it is desired to separate the fæces from the urine, the bottom of the pan is closed by a perforated valve which comes into action by a further pull of the handle after the opening of the pan valve and thus is made to deliver the solid matters it has intercepted into an appropriate receptacle.

Urinals are also arranged so that the urine may be received into a separate receiver from that into which the wash water flows. For this purpose, a rocking or turning funnel is connected with a platform by means of a toothed sector, levers and rods, or bevil wheels.

The drawings show a modification of the apparatus for water closets in which there is no central valve; but, one inclined valve leads to one receptacle, and another inclined valve to the other receptacle. In another modification, the double valve and grating are each placed in an inclined position. In one urinal shown, the funnel is only opposite the opening from the pan when it is not in use. In another urinal, the axis of the funnel is close under the pan.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1864, August 19.—N° 2061.

UNDERHAY, Frederick George, and HEYWORTH, *Robert, junior.*—"Improvements in apparatus used to regulate

" the supply of water to waterclosets, washhand basins, and " urinals."

In a regulator constructed according to this invention, a cylindrical vessel is used; the said vessel is closed at the bottom, and it has another similar vessel of smaller dimensions, but closed at the top, working readily up and down within it. Around and near the lower part of the inner vessel is a cupped leather, the lower edge of which descends into oil at the bottom of the outer vessel each time the inner vessel is caused to descend. By this means, the interior of the outer vessel is lubricated each time the inner vessel is raised. " At the upper part of the inner vessel an air " cock or valve is applied, the passage through which is capable " of being regulated according to the time during which it may " be desired the inner vessel should take in descending. The outer " vessel is fixed in any convenient position, and the inner vessel " is connected to the lever or other instrument of a watercloset, " which acts on the water supply cock or valve in such manner, " that when the lever or instrument is acted on, it moves the " inner vessel" easily, " whilst in its return the pressure of the " air keeps its outer edge against the interior surface of the outer " vessel."

This apparatus may be connected to the lever of the water supply cock of a urinal; the weight or spring acting to close the said cock is retarded by the regulating apparatus.

In a water closet with a movable seat, a bracket acts on the spindle of the supply tap to close it, and at the same time on the tail end of the weighted lever, lifting it out of action. On the rising of the seat, the water supply tap or valve opens and remains open " till the lever is allowed by the regulator to close the valve " against the flow of water."

[Printed, 10*d*. Drawing.]

A.D. 1864, August 22.—N° 2069.

WILSON, HENRY.—(*Provisional protection only.*)—" Improve" ments in water-closets, which are also applicable to ships' " scuppers, sluice valves, and throttle valves."

These improvements " consist in the introduction of a double " valve into the discharge pipe of the water-closet basin under" neath the ordinary upper valve." " Two metallic segments or " plates faced on their edges are fitted and hinged directly " opposite each other in the discharge pipe, fixed so that the

" chord lines of these segments or plates shall meet in the centre " of the discharge pipe at an angle varying from eighty to one " hundred and twenty degrees; the apex of the angle thus " formed, projecting outwards from the basin. A balance weight " is fitted to a lever, which is secured to each segment and nicely " adjusted, just to keep the faces in contact. Supposing the soil " from the basin to have been discharged through the upper " valve, it will fall upon the said double valve, this will be sufficient to open it; as soon as the soil has passed through the " balance weights will close the valve."

A pump is employed for discharging the contents of the basin. " The pump being fitted to work in a conical seating or shell " having two openings, one communicating with the basin of the " water-closet, and the other with the sea by means of a pipe " through the side of the ship. On the lower part of the pump " is a conical plug having but one opening, and fitting into the " aforesaid conical seating or shell. When it is required to " discharge the contents of the basin, the pump is put in communication with the basin through one of the openings in the " conical seating or shell, the bucket of the pump is then raised " and the contents of the basin are drawn into the pump; the " pump is then moved round until it communicates with the " sea through the opposite opening in the conical seating or shell; " the bucket is then forced down and the contents of the pump " expelled into the sea."

The said double valve, or a single valve of similar construction, may be applied "to ships' scuppers and sluice valves for discharging water or other fluids, or to throttle valves for the " regulation of the passage of steam or any fluid."

[Printed, 4*d*. No Drawings.]

A.D. 1864, August 22.—N° 2072.

TAYLOR, **Francis**.—"Improvements in apparatus for receiving, " drying and deodorizing human excrement."

This invention involves improvements on the apparatus for receiving, drying, and deodorizing human excrement described in No. 876 of the year 1861. Above the notched revolving platform described in the former Specification, a ring table of wood is fixed, by means of brackets, so as to revolve with it. " The pan under the privy seat fits on three of its sides nearly " *accurately* down on to the surface of the upper revolving table,

" the remaining side being open for the exit of the excrement " when the table revolves." The table is made to revolve by a lazy tong movement connected with the door of the privy, or by other suitable mechanism, the table thus being moved a few inches after each deposit upon it. Each time the table moves, a scraper moves across the upper table towards the centre, in order to push off the half dried excrement on to the lower platform from the upper table, " before that part of the table reappears " under the pan. Under the upper table, for two or three feet " below the privy seat, is hung in a diagonal position a board " called the water table, arranged so as to pass by the iron " brackets, and to catch all fluid dropping from both edges of " the upper table. The upper table is bevilled outwards, so that " the urine should run off."

The drawings show an arrangement in which the notched revolving platform is actuated by the motion of the lid upon a vertical axis, by means of a hinged cog. In a modification of the above arrangement, a sliding floor fixed to the axis of the lid fits closely to the bottom of the pan; on closing the lid, the excrement on the sliding floor is scraped off by the bottom of the pan and falls on the ring table. It is afterwards scraped off by the scraper and allowed to fall on the lower platform.

[Printed, 10*d*. Drawing.]

A.D. 1864, August 30.—N° 2129.

SHANKS, JOHN.—" Improvements in waterclosets."

In a watercloset for ordinary use " the discharge valve is in the " form of a flap, which closes up against a seating formed in an " inclined position in the passage. When closed the valve has " an inclination of from thirty to sixty degrees of the circle, and " is in a vertical position when full open. On the projecting " spindle of the valve there is a lever with a pin and small anti-" friction roller, and this is acted on by a curved or inclined " groove or slot in a sliding plate worked by the handle, whereby " the valve is opened or closed. An ordinary pan valve may " also be actuated in the same way."

In a ship's watercloset " two valves like those herein-before " described are used and are worked by the one sliding plate, " but the inclined or curved parts of the actuating grooves or " slots are disposed reversely, so that the lifting movement which

" closes the lower valve opens the upper one, and vice versâ. " The grooves or slots are in addition made with straight parts " so arranged that one valve is fully closed before the other " begins to open. The levers on the valve spindles may be " formed with suitable slots or grooves, the pins with antifriction " rollers being on the sliding plate or bar, instead of the reverse " arrangement herein-before described."

In a ship's closet " for use below the water level the pump is " formed with a flexible diaphragm of vulcanised rubber or the " like, and is by preference placed below the basin, so that the " matters can descend instead of ascending into it. The use of " a diaphragm dispenses with the packings required with an " ordinary piston and its rod, and with valves connected to the " part of the cylinder above the piston."

[Printed, 10*d*. Drawing.]

A.D. 1864, September 8.—Nº 2194.

TAYLOR, THOMAS.—" Improvements in urinals."

" In constructing a urinal consisting of a series of cells or " compartments " " a hollow raised trough of the length of the " urinal is employed. This trough at intervals in the front is " formed with projecting channels or short branch troughs of a " suitable form for passing between the legs of the users of the " urinal. Upright partitions are fixed so as to divide the urinals " into a series of compartments as heretofore, but in such manner " that there shall be one of the hollow projecting channels or " branch troughs in each compartment; water is constantly " supplied at one end of the trough, and it flows through its " whole length, and then away at a suitable overflow or outlet at " the other end of the trough.

" In some cases water is introduced into the trough through " the bottom in each compartment of the urinal, and an outlet " or overflow is also provided for each compartment."

[Printed, 6*d*. Drawing.]

A.D. 1864, September 14.—Nº 2242.

DE PRÉBOIS, FRANÇOIS LEBLANC. — (*Provisional protection only.*)—" A siphon with a closing apparatus."

The improved syphon, which is to be used for water closets, has an opening with a collar or neck at the extremity of its upper elbow. “This opening, slightly conical, has a diameter of about “ 2 inches at its entrance into the tube of the syphon, and of “ about 2⅓ inches at its upper part. The height of the neck will “ be of from 2⅓ inches to 2¾ inches, in order that the stopper, “ also conical, and from 1¾ to 2 inches in height, may be put in, “ so as to leave at its upper part a space, in which, after having “ put in the stopper, a small layer of tallow will be run to com- “ plete the interception of any emanation.” Should the syphon or trap become stopped up the removal of this cover will allow of the obstructing substance being removed without damaging the other parts of the closet.

A rod, with a disc at its end, is used to push the foreign body back from the ascending part to the lower elbow of the syphon, “ from whence it will be withdrawn through the pan by means of “ tongs or an analogous instrument.”

[Printed, 4*d*. No Drawings.]

A.D. 1864, October 17.—N° 2559.

HILL, ALFRED.—“ Improvements in privies, dry closets, and “ commodes, and in deodorizing substances to be used in privies, “ dry closets, and commodes.”

These improvements consist in certain arrangements whereby the receptacle of the soil is closed after the privy has been used, “ and a measured quantity of a suitable absorbent and deodoriz- “ ing powder projected on the said soil.”

The chamber underneath the seat for the reception of soil is capable of removal. Immediately under and near the front of the seat, is a partition to carry off the urine through a pipe to a receptacle. Above the seat is a reservoir filled with the deodorising powder to be used. “The lower part of the reservoir is “ formed into a hopper, the pipe of which passes through the “ seat and opens a short distance above a fixed horizontal shelf,” with vertical sides, which is situated partly outside and partly inside the receptacle for the soil. “ Immediately under the seat “ is a horizontal plate or cover which turns on an axis through “ the seat, and is provided with a handle at top by which it can “ be turned” over the top of the soil receptacle, or turned aside therefrom. A scraper on the under side of the cover can be made to sweep the powder from the shelf into the receptacle; the cover at the same time closes the hopper. When the closet is used again the turning of the handle uncovers the receptacle and (by opening the hopper) replenishes the shelf with powder.

The depression of the seat may be made to uncover the receptacle. In this case, the cover is in two halves, which open in opposite directions, by means of a screw and pinions.

The deodorising substance preferred is composed of horse droppings, carbonised at a low temperature and mixed with gypsum and dried clay.

[Printed, 10*d*. Drawing.]

A.D. 1864, October 31.—Nº 2689.

SCALÉ, Bernard.—" Improvements in fitting and mounting " chamber utensils."

These improvements " consist in forming a stand on which to " place a chamber in order that it may be at a convenient height " for sitting down upon while using it. There is besides no " danger of breaking the utensils, as is sometimes the case with " heavy persons sitting on the utensil itself." Instead of actually sitting on the chamber utensil, a suitable seat is provided, having an oval or other opening, below which the chamber utensil is placed. The utensil is enclosed within the stand, which is made of an oval form " of a size that it will conveniently enclose the " utensil; the stand is provided with a door for the purpose of " removing or introducing the utensil, and may be mounted on " castors for the convenience of moving it from place to place." A cover is provided " for the seat opening, which may be stuffed " and covered, and will serve for a small ottoman, being about " the height of an ordinary seat." " A round, square, oblong, " or other form may be adopted," but, by preference, a polygonal form for the body with an oval top, is used, the polygonal form of the body approximating to that of the oval top. " The chamber utensil may be of oval form to suit the oval opening in " the seat, or an ordinary chamber utensil may be used; it is " simply placed on a shelf, and is thereby sustained or held close " up against the under part of the seat, and may be removed " for emptying by opening the door."

[Printed, 8*d*. Drawings.]

A.D. 1864, November 3.—Nº 2725.

CUTLER, Joseph.—(*Provisional protection only.*)—" Improvements in the construction of overflow or waste pipes of cisterns " and in connections applicable thereto and to other pipes."

Instead of making the standing waste pipe a mere vertical tube open at the top, it is formed with a syphon or S-shaped head. By regulating the ball tap so that, when the water is on from the main, it just flows over and fills the trap or syphon bend above mentioned, it becomes impossible for any effluvium to escape through the waste pipe and enter the cistern.

"As there is always foul air confined below the closet, which " escapes as soon as the handle is raised," this is remedied "by " inserting a branch pipe in the overflow pipe, and conveying it " to a chimney, thus taking the effluvium up the chimney and " out of the house.

"The connection is constructed as follows:— A tube flanged " at one end is continued by a tube of less diameter, the end of " which has a male thread cut thereon. Supposing it be neces- " sary to apply the connection to the bottom of a slate cistern " to unite and attach the overflow or waste pipe, the tube is " passed the hole in the slate, the flange forming a seating; a " washer should be placed under the flange. The tube or " connection has a second thread cut around its larger diameter, " so that a nut and washer underneath the cistern may be " screwed thereon to tighten and fix it in position; then the " upper portion of the overflow pipe or that which is in the cis- " tern is screwed into the enlarged portion of the tube down to " an internal washer, and the descending pipe below the base of " the cistern is screwed or fixed on to the lower extremity of the " connection."

[Printed, *4d.* No Drawings.]

A.D. 1864, December 16.—N° 3115.

BARDWELL, William.—"An improved method of utilizing " sewage and urine, and for facilitating their passage through " pipes, thereby preventing the pollution of rivers and streams."

This invention consists in a mode of and apparatus for treating sewage by adding sulphate of lime to it, by preference that made from the gypsum of France, Belgium, Norway, or Sweden. After this substance has been added, the liquid is made to pass through a filtering bed of sand and gravel. It is proposed to collect the urine from public urinals, and fix the ammonia therein contained by means of sulphuric acid. The following is contained in the Provisional but is not repeated in the Final Specification:—"To

" prevent the solid portion of the sewage from firmly adhering
" to the sides of the distributing pipes, thereby clogging or
" choking the bore, I pass alternately through the pipe the
" sewage in its normal condition and the supernatant liquid
" from the sewage and urine treated as before mentioned, which
" alternation has been found effectually to prevent the permanent
" adherence of solid particles to the pipes.

[Printed, 1*s*. Drawings.]

A.D. 1864, December 16.—N° 3121.

WHITE, JAMES.—"Improvements in closets and commodes."

This invention consists in certain improvements and additions to the arrangements of apparatus described in No. 1316 of the year 1860.

In the closet described in the present Specification, the soil falls through the seat, and through an earthenware pan into a receptacle below. This receptacle is a cylindrical trough, "partly or " wholly open at the top, and closed at one or both ends, an " outlet being provided either through one of the ends or at the " bottom near one of them." Screws, acting as stirrers, rotate in the trough and to its inner surface are attached blades of a similar character to those forming the screws and placed alternately with them. At the back of and above the seat is provided a reservoir of dry earth, at the lower part of which is placed a roller, provided with longitudinal ribs, and made to rotate horizontally in a "cylinder open top and bottom," the upper part of which is in direct communication with the reservoir. "By " causing this roller to revolve one or more quarter circles, a " quantity of earth contained between two or more of the said " ribs is discharged through the lower opening, and into the " trough below on to the excrementitious matter. Suitable gear " work is provided, which on the turning of a winch handle " causes the screw or mixer to revolve, and also the measured " quantity of earth to be discharged."

The mixing and discharging apparatus may be made self-acting, gear work being attached to the entrance door of the closet; other self-acting arrangements may be used.

Another improvement on the apparatus described in the above-mentioned Specification "consists in allowing the excrement to " fall into a pail or suitable receptacle with or without the

" intervention of a bottom or valve between the earthenware " pan and such pail or receptacle;" an earth reservoir is added as in the preceding apparatus.

The drawings also show an apparatus "employed in a closet " or commode to which a valve or cover is applied, so as to pass " under the pan when the closet or commode is not in use, and " move out of the way when in use."

[Printed, 1*s.* 10*d.* Drawings.]

1865.

A.D. 1865, March 8.—N° 648.

SHANKS, John.—" Improvements in watercloset apparatus."

Parts of the invention are improvements on arrangements described in No. 2129 of the year 1864. According to one arrangement, in which the main discharge valve is opened by the action on the valve-spindle lever of an inclined groove in a vertical slide, there is added a second grooved slide to act on the lever of the water tap. Both slides work on two guide rods, and the top slide is above the other and is lifted by it, but does not descend with it, its descent being retarded by any suitable regulator, in order to allow of the partial filling of the basin after the main valve is closed. Among the regulators described is an india-rubber ball, from which the air is expelled when the handle is lifted, and into which the air gradually entering regulates the closing of the valve and the flow of water into the basin.

Another is an "air chamber regulator," in which the regulating details are applied in immediate connection with the water valve.

Another modification is a hollow lever partially filled with shot and connected with the tap lever in such a manner that when lifted to open the tap the shot runs to one end, but on the handle being let go a spring moves the hollow lever sufficiently far back for the shot to begin to run back; when the shot have all run back, the tap lever is closed. When it is necessary to economise water, a cistern with a float tap is used. This is constructed and arranged so that, among other advantages, when the closet handle is raised the main supply is stopped; thus the water cannot be improperly wasted.

[Printed, 10*d.* Drawing.]

A.D. 1865, March 13.—N° 707.

RATTRAY, Robert Gordon.—(*Provisional protection only.*)—
" Improvements in apparatus for supplying regulated or measured
" quantities of water and other fluids."

A vessel of the cubic capacity to contain the desired quantity is employed. At its upper end is a supply passage, "which at " its lower end rests on a stationary valve which is supported by " a valve rod, the upper end of which is fixed in or suspended " from a bracket or other fixed support; the valve rod passes " through a stuffing box at the upper end of the supply pas- " sage. At the upper part of the measuring vessel is an air " valve which opens by its own weight, but is closed by a float " which is caused to rise when the vessel is full of water or other " fluid. The water or other fluid is supplied" "by preference " by a flexible pipe or tube connected to a branch pipe on the " supply passage." At the lower end of the measuring vessel " is fixed an outlet passage having a valve to cover or close its " upper end. The stem of this valve rests on a cross bar fixed " on the interior of the upper end of a vessel into which the " outlet pipe of the measuring vessel descends; when the mea- " suring vessel has been filled and has been allowed to descend " it rests on and is supported by the upper valve, whilst the " lower valve, by reason of its not being allowed to descend with " the measuring vessel, becomes open, and the water" "flows " out therefrom. When the vessel is raised the lower valve " becomes closed, and the upper one is opened, and the water " or other fluid flows into the measuring vessel."

"This form of apparatus is applicable for supplying a regu- " lated quantity of water to a watercloset, a wash basin, a urinal, " or otherwise."

[Printed, 4*d*. No Drawings.]

A.D. 1865, April 5.—N 967.

DARRIBET, Jean Isidore. — "Improvements in seats of " water-closets."

"The seat of the watercloset in actual use is usually pierced " with a round hole varying in size, but always incommodious, " and often dangerous. The distance of the tangent parallel to " *the front is on* an average four inches backwards."

The improved seat "is of an elliptical shape, the two circumferences being joined by a pear-shaped neck of more or less diameter according to circumstances or requirement. The tangent of the small curve on the fore part is on the contrary in projection from the front of the seat about 4 inches, more or less, also according to circumstances." This form of seat may be adapted to night stools, and to arm chairs; in the latter case "the orifice will be of reduced size, and be surmounted by a moveable frame stuffed and covered with cloth, linen, leather, or other material." This improvement "may also be applied to ordinary waterclosets, and after having been used this moveable padded frame can be suspended to the side of the closet or of the paper holder." "This method may also be usefully applied to public privies, those of schools, barracks, railways, and others, where evacuations of every sort are multiplied, it will only be necessary to lengthen the neck of the opening, and conduct it perpendicularly or obliquely over the pit." The pan used with this seat "is of elliptical shape, with or without hydraulic trap, and pierced or not according to its application. The lid may be moveable or fixed at the back by hinges, and the under side may be lined with a sheet of lead or zinc, and be provided with an elastic padding, which will greatly contribute to render the watercloset inodorous."

[Printed, 6*d*. Drawing.]

A.D. 1865, April 20.—N° 1096.

TAYLOR, Henry Kindon.—"Improvements in indicators and fastenings for waterclosets and other purposes."

The object of this invention is the application of an indicator or signal to a closet or other private room, to denote on its exterior whether the said closet or room is occupied or not.

The said indicator is combined or connected "with the fastening to the door in order that the setting or placing of the indicator or signal may be rendered compulsory on the part of the person when entering a closet or other private room." The removal or withdrawal of the signal is self acting on the person opening the door to leave the closet.

According to one arrangement, a sliding shutter is mounted in a frame to close an aperture in the door of the closet. When the closet is unoccupied, the sliding shutter is kept back by an india-rubber spring so as to uncover the aperture. A bolt is applied to the shutter, so that the act of fastening the closet door is also the means of closing the aperture. The word "engaged" on the exterior of the shutter indicates to those outside that the place is occupied.

The drawings show a lever indicator carrying a bolt, fixed to the inner side of the door and moving freely on a pin, so that when the bolt is withdrawn from the staple fixed on the frame of the door, the weight of the enlarged end of the lever (covering the aperture) causes it to fall into a position nearly vertical, thus removing the signal by the act of unfastening the door, the act of bolting the door being the means by which the aperture is closed with the signal.

[Printed, 10*d*. Drawing.]

A.D. 1865, May 17.—N° 1364.

FLETCHER, Fielding.—(*Provisonal protection only.*)—"Im-" provements in waterclosets."

On a rim or projection formed at the bottom of a watercloset basin is fixed a flexible tube; to the other end of the tube is a metal ring which prevents its collapsing. The tube is so arranged that it can be raised or lowered at pleasure. "When the tube is " raised to the required height the water is retained in the bottom " of the basin until it has attained the same elevation as the raised " end of the tube, and any surplus supply of water will pass over " into the syphon below. The end of the tube being lowered a " little below the level of the bottom of the basin the contents of " the basin will pass freely into the syphon below.

[Printed, 4*d*. No Drawings.]

A.D. 1865, June 30.—N° 1740.

ROSSER, Henry William.—"Improvements in the mechani-" cal arrangements of waterclosets for ships."

"This invention consists in the application of force pumps to " waterclosets of ships for the purpose of supplying water for " cleansing the closet pans.

"When a soil or discharge pump is used to empty the closet " pan, which is usual when the closet is fixed below the water " line," one or more force pumps are employed to each closet, " according to the necessary amount of cleansing water required."

The drawings represent the additional force pump, worked by a separate handle to that for the soil. The handle is on the prolongation of the piston rod. The soil and force pumps may either be worked separately " or be connected by levers or other " suitable gear, so as to supply the necessary amount of cleans- " ing water at the same time that the soil or discharge pump is " emptying the closet pan." The addition of a three-way cock on the discharge pipe of the force pump, will enable the said force pump to supply water to a bath or elsewhere.

" When there is not any soil or discharge pump attached to the " closet pan, as in the case of ships' waterclosets fixed above the " water line, the force pump is employed to supply the cleansing " water for the pan instead of the water supply cistern now " usually employed for that purpose."

The additional force pump draws its water from the sea or other source.

[Printed, 10*d.* Drawing.]

A.D. 1865, July 19.—N° 1879.

NICHOLAS, Charles.—(*Provisional protection only.*)—" A new " or improved apparatus for supplying disinfecting liquids to " waterclosets, urinals, and other places requiring the same."

As applied to a water closet, the principal parts of the apparatus are placed in a cistern containing the disinfecting liquid. From the cistern the disinfecting fluid passes to a small closed chamber which acts as a measure, the said measure being at the bottom of the cistern. From the measure, the disinfecting fluid passes to the water closet.

" The measure is alternately filled and emptied by mechanism " constructed as follows":—At one end of a lever inside the cistern near its top, turning in a vertical plane, is a wire passing vertically downwards to a valve on the bottom of the cistern, which opens or closes communication between the cistern and the measure. A wire (the "discharge wire") connected with the crank of the water closet, and hanging from the other end of the lever, passes down a tube fixed on the bottom of the cistern. Another wire is between the discharge wire and the lever's axis; it passes " down a tube into the measure, and is connected with a " valve which opens and closes the communication between the " measure and a pipe opening over the pan of the watercloset."

When the closet wire is pulled down, the disinfecting liquid fills the measure; when it is liberated, the liquid passes to the water closet pan. "By connecting the discharge wire with the crank "of the watercloset the apparatus is made automatic."

In applying this invention to urinals and other places "the "discharge wire may be pulled by hand when it is required to "discharge some of the disinfecting liquid into the urinal or "other place. In the case of urinals the apparatus may be "worked by the weight of the person using the urinal."

[Printed, 4*d*. No Drawings.]

A.D. 1865, September 4.—N° 2270.

KETTLE, Stephen.—"Improvements in watercloset apparatus, "urinals, and the like, and appliances thereto."

In a water closet constructed according to this invention, the trap is made sufficiently large to receive the pan of the container. The oval soil pan valve works on a spindle that is mounted in bearings attached to the sides of the container. A lever, fixed to the spindle, is worked by the pull or by the depression of the seat. The pan valve is closed by counterbalance weights when the pull is released or the weight on the seat or footboard is removed.

The cylindrical case of the water supply valve is fitted with a supply pipe and an outlet pipe, each coming into the case at right angles therewith, nearly opposite to each other, the supply pipe being lower than the outlet. The case also has an internal flange with a central hole, and the piston valve is doubled faced, being open at its intermediate position, but shut against the internal flange when at either extremity of its stroke. In order that, when raised, the valve may descend gradually, an enlarged lower chamber in the valve case contains a shell to receive the end of the piston. The bottom of the shell is perforated to allow the water from the supply pipe to enter the shell in which the lower end of the piston is fitted water tight. A small hole in the piston obliges the water to flow out from the shell (during the descent of the piston) at a given rate, thus allowing the flushing water to flow a sufficient time to cleanse the basin, pan valve, and container.

A turn-over closet is described. The turn-over soil pan is supported by a spindle working in axes in the container. A cup trap is suspended from the pan by chains. When the pan is tipped (either by hand or by apparatus) the cup trap is opened. A night commode is shown in the drawings, similarly constructed but without a trap. Also a lavatory basin is shown.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1865, October 4.—N° 2546.

DE RUSETT, EDWIN WILLIAM, and DALE, RICHARD FARRELL.—" Improvements in ships's waterclosets."

This invention is applicable to water closets in steam ships.

Steam is employed, in ships' waterclosets, to aid in discharging the contents of the pan, and in flushing the closet.

Under the pan is fitted a box, " into which a weighted valve " fitted to the pan opens, and is itself fitted with an outlet valve " opening into a passage which leads to the sea. The valve to " the box is connected to a pull lever. Another communication " from the sea leads water into a chamber at the side of the box " and from thence by a pipe into the upper part of the pan. A " steam pipe leads steam from a boiler or otherwise into the " chamber and into the box; steam valves admit and exclude " steam as required.

"The action is as follows :—Upon drawing up the pull lever " the box valve is opened and steam is admitted into the box; " the steam by its pressure closes the pan valve and drives the " contents of the box through its outlet valve and through the " passage with which it communicates into the sea. As soon as " the contents of the box are discharged the valve closes and " shuts off the supply of steam, the pan valve drops and the " contents of the pan fall into the box to be acted upon as before " described, and at the same time opens the steam valve for admitting steam into the chamber, which forces the water contained therein through the flush pipe into the pan. The steam " condensing into the chamber creates a partial vacuum which " is supplied by water from the sea."

Besides the above-described arrangement, the drawings show two others. In one, more particularly adapted to ships' closets above the load water line, " the apparatus consists essentially of a " flushing chamber arranged in communication with the steam " pipe and with the suction pipe which conveys the water from " the outside of the vessel into the flushing chamber." The second modification is "adapted more particularly for ships' " closets which are arranged at or about the level of the water " line;" the steam passes into the soil chamber by a pipe, the passage of which is controlled by a valve in the valve box.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1865, November 13.—N° 2912.

ELLIS, Peter.—"An improved description of watercloset."

This closet is called "the cylindrical double-pan closet." The pan is of large size, with part of its bottom inclined, so that a good amount of water is retained therein; it is balanced on axles that have bearings in a vertical standard, a counterpoise keeping it in position. A capacious nozzle or spout, belonging to the pan, descends "to a near contact with an equally poised or balanced " pan closing the mouth of the customary trap connected with " the soil pipe. Within the said first-described pan, but sup- " ported independent of it, is an enamelled oval or circular rim." " Attached to the first pan is the handle of movement, to which " is also attached a water valve." When the handle is raised, and the pan thereby tilted, the nozzle descends upon the under pan, " and opens a communication through the trap into the soil pipe " to the sewer, and at the same time the valve for cleansing the " pan and flushing the pipe is also opened."

The drawings also show the pan adapted for use in schools, &c. For these purposes it need not be movable, and for schools its length may be increased so as to suit several compartments, and cleansed by one flushing arrangement that is independent of the use of the closet. The service box for the occasional flushing has a container adjoining it (and opening into it) just large enough for the operation of the two floats that are concerned in its working; one float is used to retain the larger float in position (by means of a ratchet) until the water has risen to a sufficient height to liberate the smaller float, the exit valve is then suddenly opened by the large float and the flushing takes place.

The "oval or circular rim" is the same as the basin of the ordinary closet. The water supply valve is a "piston valve with " leather or india-rubber seat"; the handle acts upon this valve by a spur, and it is left to close gradually by the operation of an attached weight.

[Printed, 8d. Drawing.]

A.D. 1865, December 8.—N° 3153.

DE MONDÉSIR, Piarron, LEHAITRE, Paul, and JULLIENNE, Augustin.—" An improved mode of applying the " compression of air for ventilating purpose, and the compression " of any gas for hurrying along elastic fluids in conveying " pipes."

" This invention consists in applying for ventilating purpose " the moving force of compressed air darted or impelled through " the centre of a conveying pipe of a much larger size than the " central stream of compressed air, and also in applying a stream " or jet of any compressed gas for hurrying or driving along " elastic fluids in conveying pipes."

The drawings show conveying pipes that are straight as well as some with right angled bends, with either one or two jets of compressed air according to the direction in which the current is to be determined in the conveying pipe. " By modifying either " the pressure or the relation of the diameter one may obtain in " the conveying pipes currents of various velocities." The apparatus may be applied either for sucking in or for forcing out as may be required.

The apparatus may be used (among other purposes) for " the " purification of cesspools, sewer pits, or waterclosets provided " with ventilating pipes, and for increasing the draught of " chimneys or fire-places by directing a jet or stream of com" pressed air in the said pipes, chimneys, or funnels."

[Printed, 8*d*. Drawing.]

1866.

A.D. 1866, January 15.—N° 135.

NEWTON, Henry Edward.—(*A communication from Ernest Mangeon.*)—" Improvements applicable to water closets and " commode pans."

These improvements are for the purpose of preventing the emanation of bad smells from the above-mentioned articles.

The chief means that is relied upon is the hermetically sealing of the cover of the water closet or commode pan or basin. An annular water (mercury or sand) channel being formed round the top edge of the pan, and a circular metal ring projecting edgewise from the under side of the hinged cover, when the cover is shut down the ring projects into the water and forms a water seal.

Another portion of this invention consists in forming the sides of the pan or basin vertical instead of inclined.

" The third part of the invention consists of a disc valve the " size of the pan, mounted on a rock shaft secured in bearings " attached to the lower extremity of the pan, and to which shaft " is attached a slotted lever which is worked by a pin on the end " of a sliding bar connected to the under side of the cover by " means of a connecting rod, so that when the cover is raised " the valve will close, and when it is shut down the valve will " open, or it may be arranged to work vice versâ. Instead of " this arrangement a counterbalance weight may be used to " restore the valve to its normal position."

A "Turkish closet," having a rectangular basin and the other details as set forth above, with a vessel underneath the pan communicating with the soil pipe, is described and shown. Another form of this closet has foot rests outside the seat, and the seat has a protuberance in front between the two foot rests, to catch the urine. The opening of the door of the closet may be employed to set the apparatus ready for use. Commodes are shown in which a counterweight restores the valve to its normal position. In the channel of the basin an india-rubber tube may be employed in connection with the ring or rib of the cover. When a removable vessel is used, it has a water joint and is raised up to its place of use by a platform and parallel motion levers. A vessel for prisoners, with a gutta percha cover is shown.

[Printed, 1*s* 6*d*. Drawings.]

A.D. 1866, January 22.—N° 199.

BROADFOOT, JOHN.—(*Provisional protection only.*)—" Improvements in waterclosets."

Water closets are constructed " with double discharge valves, " so as to be suitable for ships and other situations. One of the " discharge valves comprises a spherical piece with a cylindrical " passage made through it of the size of the discharge passage. " The spherical piece is held in a spherical box lined or partially " *lined with leather* and formed in halves, and is turned by means

" of a horizontal spindle to which a hand lever is attached. The " spindle has a small eccentric on it for opening the water valve " or tap, and it has also on it a short lever connected by a link " to a lever which actuates the second valve. The discharge " passage deviates laterally from the the first discharge valve, " and enters the side of what constitutes the box of the second " valve and the top of the final discharge outlet. The second " valve is a lift valve in the form of a plunger, which rises into " a cylindrical shell above, so that matters cannot get above it, " and it has its seat on a ring of rubber or the like fixed upon " the metal seat. The rod of this valve passes upwards through " a stuffing box and is acted on by the lever before mentioned; " but the lever has a certain play between shoulders or stops on " the rod, in consequence of which the first valve is opened and " closed again before the second valve opens, and both valves " are never both open at once. The required delay in opening " the second valve is also to some extent provided for by the " lever on the first spindle being set so as not to move the second " lever much until the spindle is turned some distance. The " actuating details may be modified in various ways to suit " different requirements; for example the lever on the main spindle " may be actuated by an ordinary lifting handle and rod, " and it may act directly on the spindle of the second valve, thus " dispensing with the intermediate lever herein-before described."

[Printed, 4*d*. No Drawings.]

A.D. 1866, February 9.—N° 412.

GIAJOLA, Charles Emile.—" Improvements in privies and " commodes."

The object of this invention is "to prevent the escape of any " offensive odours from the privy or commode."

The soil pan has a cover with a circular flange which dips into a water channel at the top of the soil pan and thus forms a water seal. At the bottom of the soil pan is another flange which dips into a water channel on the neck of the container. When the contained is removed, the platform upon which it rests is lowered by means of a screw, and, being mounted on wheels, it can be removed with facility; a loose lid is "made to fit the channel on the " neck of the soil container when the latter is being removed."

The Final Specification describes, and the drawings show a cylindrical blower or bellows, the lid of which is weighted and raised by means of a lift rod, at the top of which a folding handle is fitted. Disinfecting powder or liquid may be admitted into the blower pipe, and air is blown into the lower part of the soil pan when in use; the current of air being downwards, prevents any unpleasant smell from rising.

In using the closet, the lid or upper seat is raised by hand, the lid in the under seat is removed and placed in a side recess, the handle of the blower is then pulled up and let fall, and the upper seat lowered. To close the apparatus, the upper seat is raised, and the cover or lid replaced.

[Printed, 10*d*. Drawing.]

A.D. 1866, March 27.—N° 898.

LIERNUR, Charles Thieme.—"A pneumatic method for the " the inoffensive removal of all fluids, solids, and gases from water- " closets or privies and their conduits, and of storing said ma- " terials so that they may be applied in their natural unchanged " form to agriculture and other branches of industry."

The object of this invention is to empty privies by atmospheric pressure; "to accomplish the above object without offense to the " inhabitants; to collect, store, and transport the excrements in " an inoffensive manner; to apply the excrements to lands as a " fertiliser in such a manner that direct contact with the seeds is " prevented, and that all useful latent gases are solved and ab- " sorbed by the soil without contamination of the surrounding " atmosphere." These four points constitute the one design to render human excrements useful and not dangerous.

The following particulars relate to emptying privies.—A reservoir under the pavement, and accessible by carts, receives drain pipes from the adjacent houses. Slide valves close these pipes, which communicate with the bottom of the reservoir by means of a vertical tube, inside the reservoir, descending within a few inches of its bottom. The slide valves being closed, an air pipe (communicating with the top of the reservoir) is opened, and the air is exhausted therefrom. The air pipe being then shut, and the slide valves opened, the contents of the closets rush into the reservoir. The reservoirs are then emptied into vessels on carts, and the sewage matters are stored in wooden barrels, each operation being effected by the pneumatic process. Subsoil application of the sewage matters is effected by placing the said barrels on ploughs and discharging their contents, by means of a pipe, into the furrows made by the plough share, then "closing the said " furrows again immediately afterwards by scrapers." In manuring meadow land, a knife is used, standing upon a broad hollow foot, instead of a ploughshare.

[Printed, 10*d*. Drawing.]

A.D. 1866, April 14.—N° 1062.

BLUNDELL, George Thomas.—(*Provisional protection only.*) —" Improvements in screw valves for waterclosets."

" The invention has reference to screw valves for regulating the " supply of water to waterclosets, and consists in constructing " them with a particular description of conical plug fitting a corre- " sponding conical seat situate in or across the flow or passage " way for the water, and made to move into or away from the " seat (for opening or closing the valve) by turning the stem or " spindle of the plug, the said stem or spindle having a quick " threaded screw thereon which works through a screwed bush or " nut.

"The particular description of conical plug consists in its being " constructed with its effective or working end or conical portion " made as a conical ring or hollow cone, and with the stem coni- " cally fitted into and capable of being turned round within the " ring or hollow cone, thereby allowing the plug to be pressed " forward into the seat or to be withdrawn by turning the stem " without of necessity turning the ring or hollow cone. A handle " or lever or hand wheel may conveniently be fitted to the stem " for the purpose of turning it."

[Printed, 4*d*. No Drawings.]

A.D. 1866, May 10.—N° 1337.

HACKETT, William, and MARSDEN, William. — " Im- " provements in the construction of waterclosets and in the valves " connected therewith."

A hinged or flap valve is applied to the bottom of the pan or basin; the said valve is covered with india-rubber and its axis is provided with a counterbalance weight which keeps the india-rubber surface in close contact with the bottom edge of the pan. The lift handle is connected to the weight. Outside the basin is a float chamber, in communication therewith by means of a water way; the float is connected by a lever with the water inlet valve, just outside the soil pan. "If the handle be lifted and the pan "valve opened the water (and soil if any) in the pan flows away "and the water in the outside vessel also flows from beneath the "float and away down the 'soil pipe,' and as the float falls it "opens the water supply valve and lets water into the pan, and "as long as the handle is held up the water flushes through the "pan, but on releasing the handle the bottom valve is closed, "and the water rises in the 'soil pan,' passes up the water way, "and lifts the float which closes the water inlet valve, and as the "lever connecting the float and valve is rendered adjustable by "screw or slide the water valve may be closed when sufficient "water has been admitted to the pan."

This invention also consists of a water inlet valve which may be applied to the pan of the above-described water closet by means of the float lever. This valve has "an annular space to which "water is admitted, the exit therefrom being closed by a disc of "india-rubber which the pressure of water keeps tight against a "ring or seating, and the disc is pressed from such a seating to "open the valve by means of the head of a shaft, on which is "formed a spiral twist of long angle, which working in a corre-"spondingly formed nut in the valve case effects the opening or "closing of the valve." The pressure of water being on the opposite side of the disc to the shaft, in the valve shown in the drawings, it does not appear that the pressure of water keeps the valve tight, in that instance.

[Printed, 8*d*. Drawing.]

A.D. 1866, May 12.—N° 1363.

CHAPMAN, Thomas Jackson, and ROSE, Thomas.—"Im-"provements in the construction of water closets."

In the improved closet, the space in which it is enclosed is made to act on the cistern. When the seat is pressed down by the person using the closet, a weight is raised from a flexible bag which then fills with water. On the removal of this pressure, the water in the bag is forced into the basin. A balance pan is fitted to the bottom of the basin, so that when the weight of matter in the pan exceeds the balance the pan turns over and the matter falls into the trap. There is a space around the pan, so as to allow of a water joint being always formed there. A valve is provided to prevent the water being forced back from the flexible bag into the cistern. When it is desired to make the closet act noiselessly, two flexible bags are used, "the one to fill into the "other;" the weight for one bag is removed, whilst the weight for the other is "added by the ordinary movements of the move-"able seat," when the closet is used.

[Printed, 8*d*. Drawing.]

A.D. 1866, June 5.—N° 1552.

DUMUIS, Desiré Alfred, FLICOTEAUX, Elmir Jean François, NIBLETT, Edward William, and LAVATER, Manuel Leopold Jonas.—"Improvements in waterclosets, "urinals, lavatories, and other receivers, and also in taps for "supplying liquids to the same."

1st. Ships' water closet apparatus.—This arrangement is worked by a lever connected with a pump rod and with the rods of certain valves. As the apparatus is intended to work below the water line, the following valves are employed; one at the bottom of the basin, the axis of which is acted upon (through rods and an arm) by the pump lever; one at the bottom of the pump which is closed at the end of the stroke of the piston; an exit valve opened by the descent of the piston; and a repair valve (connected with the lever), which is only shut during repairs. This method of opening the pan valve may also be applied to other water closets or urinals. A regulating valve with lever and counterbalance is shown.

2nd. The self-action of the seat in valve closets with earthenware basins provided with a hollow piston covered with indiarubber. Also other arrangements of plugs, valves and traps.

3rd. Fixing the separator close up to the trap or syphon.

4th. The foot plate of urinals is attached to a hinge, and the counterbalance weight and valve are placed in a box underneath the basin.

5th. The addition of a diaphragm or stuffing box to the small regulator of hydrostatic valves, thus rendering the valve applicable to ordinary water closet apparatus.

6th. Gearing applied to valves; namely, a fly wheel provided with movable weights, also a screw wheel and an air cylinder.

7th. In hydrostatic ball valves, placing the lever connection between the large diaphragm and the chamber, so as to dispense with a stuffing box. Regulating the flow of water into a series of superposed reservoirs. Also an air chamber to prevent shocks by suddenly cutting off water in water pipes.

8th. Fixing a discharge valve to its lever by a spherical headed screw; also an arrangement of the discharge pipe in lavatories; lastly, rendering the basins of receivers movable in order to open the discharge valves.

[Printed, 6*s.* 4*d.* Drawings.]

A.D. 1866, August 24.—N° 2183.

JENNINGS, Josiah George.—"Improvements in water-"closets, urinals, and taps."

These "improvements in water-closets relate to closets in which "the pan discharges itself by a side opening into the upright "limb of a syphon trap." The said trap is cast with its upright limb separate from the pan or basin, which is connected to the said trap by cementing it into a socket. "The valve seat is "formed in the upright limb by cementing into it an earthen-"ware or glass ring. The discharge valve has an overflow "passage formed through it and its handle passes up through a "cap fitted on to the upper end of the upright syphon." The water supply valve "is carried on a bracket which fits on and "against the upper end of the syphon limb immediately under "the cap" which secures it in its place; the valve is opened by raising a lever which is lifted with the handle of the discharge valve.

In urinals, the tap attached to each pan, is so connected with the grating on which the user stands, as to open when the said grating is depressed. A valve with an earthenware or glass seating is used, by which all the pans may be emptied simultaneously, and each pan is provided with a separate overflow at the surface, by which any floating matter may escape.

Supply taps are constructed with a valve that closes with the flow of the water, and are regulated by a piston to prevent the valve too suddenly closing. When it is desired to draw water, the stem of the valve (which passes through a stuffing box), is depressed by a lever. Under the valve is an opening by which the valve is introduced into its place; the hole is then closed by a screw plug. A porcelain tube is cemented into the hole in the plug, and the valve spindle (with a small exit hole in it) enters the said tube. As the water is some time returning through the exit hole, the closing of the valve is gradual. If the water pressure is insufficient, a "spiral" [helical?] spring lifts the valve into its place. The valve seats of supply taps are bushed with rings of earthenware or of glass.

[Printed, 1*s.* 10*d.* Drawings.]

A.D. 1866, September 8.—N° 2315.

WARNER, Frederick, STEWART, William, and BARBER, George William.—" Improvements in waterclosets, and in " valves and regulating apparatus for the same, and other " purposes."

In constructing water closets, an ∽ or syphon trap is employed as heretofore, and the basin or pan communicates " with the " ascending limb thereof both by a side opening to which a flap " valve is fitted, and also by an overflow passage," which opens into the ascending limb at a point above the valve, and thus determines the quantity of water which is retained in the pan. The handle rod of the closet passes through a cap on the top of the syphon trap, and its lower end is jointed on to the valve, by means of a slotted eye; the said rod also has an arm that actuates the water supply apparatus. The weight of the valve and handle ordinarily keeps the valve shut.

According to another part of this invention, the flow of water may be governed by "a flap valve with a toothed segment at its " back gearing with a worm, the stem of which passes out of " the valve case through a stuffing box and receives a key or " handle."

In certain cocks and valves, an axis, with an eccentric upon it, works in an opening in the valve stem, which is at right angles to the axis. By turning the axis in one direction or the other, the valve is either jammed against its seat or removed from it.

The following arrangement is employed to regulate the quantity of water supplied to a water closet each time that the supply valve is opened :— The supply valve is connected with a separate apparatus, in which a piston is raised at the opening of the valve, and depressed during the time of its closing. A spring constantly tends to depress the piston in its cylinder, which cannot take place at once because of the oil contained in the cylinder, and the narrowness of the passage through the centre of the piston. The piston is raised easily, because of the position of its cup leather. A regulating wire passes up the passage.

In another piston and cylinder regulating apparatus, the regulating wire is omitted, and a second outer tube is applied to the hollow piston rod; the oil passes up the inner tube, through a passage at the top (regulated by a screw plug) and returns to the top of the piston through the outer tube.

[Printed, 10*d*. Drawing.]

A.D. 1866, September 12.—N° 2346.

WHEELHOUSE, THOMAS.—"Improvements in apparatus for " sanitary purposes."

To the water main pipe are affixed upright pipes, having stop cocks attached. A cistern, filled with a disinfectant, is placed around each pipe, and is covered with a grating. When this cistern is partly filled, the liquid flows off and disinfects the sewer into which it passes. A pipe is placed in communication with a receptacle or cistern, charged with a disinfectant under public water taps, and the waste water from them is made to flow into and flush privies. Another part of this invention consists in constructing ash-pits for privies with a perforated false bottom, so as to allow any moisture then collected to run off. A diagonal partition guides the ashes to the under side of the seat of the privy.

[Printed, 8*d*. Drawing.]

A.D. 1866, September 25.—N° 2457.

CHANDLER, JAMES.—(*Provisional protection only.*)—" Im" provements in apparatus for drawing and preventing waste " of water from service pipes or cisterns."

This invention " consists of a self-closing valve inclosed in " a metal case, which valve is opened by the pressure of the " hand or thumb acting upon a pin from the outside of the said " case, which pin presses on the one end of a bell crank inside " the said case; the other end of which bell crank presses upon " the spindle of the valve and causes it to open and allow the " water to flow into the metal case, the lower end of the said " valve being connected to the service pipe or cistern. The metal " case before mentioned is provided with an opening similar to " a common pump nozzel, which allows the water to flow out " into any vessel required, and upon the hand or thumb releasing " *the pin before* mentioned the valve closes by the pressure of

" the water acting on the back of it, and assisted by a spring " attached to the top end of the valve spindle, and hence the " non-liability of the valve remaining open, and thus will prevent " waste of water."

Besides other applications, the foregoing apparatus is " intended " for use in waterclosets, to be placed in reach of the hand or " other convenient position, and worked as before described, " or by a rod, wire, or cord attached to the bell crank. In this " application a boss will be provided on the metal case suitable " for attaching an ordinary pipe to, instead of the nozzel before " mentioned, which pipe will lead to the pan of the closet. The " valve to be connected to the service pipe or cistern as before " described."

[Printed, 4*d*. No Drawings.]

A.D. 1866, September 27.—N° 2493.

LYTHGOE, THOMAS. — (*Provisional protection only.*)—" Im- " provements in waterclosets, ash-pits, cesspools, and similar " places."

" The object of this invention is to filter the refuse of water- " closets and similar places so that the refuse liquid which " escapes shall be almost pure water, and consequently not liable " to pollute rivers or streams into which such refuse runs." This desirable object is accomplished " by allowing the refuse " to fall on a perforated trap, lid, or casing, so that the liquid " shall pass through the said perforations into a reservoir under " it. The perforations are made conical, that is to say, large or " bell-mouthed at one side and small at the other side, which " will thus filter the liquid, and by boring or making the said " perforations on both sides of the lid or casing it can be used " either side up, so that if the holes or perforations become " stopped by turning it they will become opened or cleared."

Another filter is made in the reservoir, the same as the one described above, " which allows the liquid which has already " passed through the first filterer to fall into another reservoir, " thus making a double filterer," and if found necessary, the number of filterers and reservoirs may be increased. From the last reservoir a pipe is passed " to the flue or shaft of the chimney " which will carry off any offensive smell that may arise there- " from."

[Printed, 4*d*. No Drawings.]

A.D. 1866, October 3.—Nº 2532.

CAVANAH, James.—"An improvement in waterclosets, cis-"terns, and soil traps."

1st. "The construction of the valve through which the water "is conducted to the pan of the watercloset; this valve is so "constructed that when at rest it is or may be worked as re-"quired by means of a spring and washer, which spring may be "made of either steel, iron, brass, india-rubber, or other suitable "elastic material, and may be either flat, spiral, or of other "suitable shape, in order to press tightly over the valve pipe "and prevent the passage of any water. When the passage of "water is required the valve may be lifted by a lever, handle, "rod, chain, or other suitable means. The spring and valve "may be applied to any part of the cistern, water pipes, or basin "as may be found most desirable." The drawings show the flushing valve of a water closet cistern fixed to the end of a blade spring. In another instance, a helical spring is placed above the valve lever.

2nd. "An improvement in the soil trap, which may be made "of iron, earthenware, or other suitable material; this trap is "constructed with an opening in the top or other convenient "part of the trap for the purpose of cleaning it out; when re-"quired this opening will be fitted with a lid or stopper which "will be air-tight when fixed, and will be removed when the "trap or pipe may happen to become stopped or require clean-"ing." The drawings show a stopper secured by an india-rubber washer, a cork stopper, and other stoppers.

[Printed, 8*d*. Drawing.]

A.D. 1866, October 24.—Nº 2750.

TAYLOR, Francis.—"Improvements in apparatus for receiv-"ing, drying, and deodorizing human excrement."

This invention has for its object improvements on the apparatus described in No. 876 of the year 1861, and in No. 2072 of the year 1864.

A movable inclined floor, under the pan of the privy seat, "is "moved when the lid of the seat is moved, so that the solid "matter deposited upon it, after the liquid has been allowed to "run off, is scraped off and made to fall on the revolving table "*below*. *Fastened to* and under the moveable floor of the pan

" are two scrapers acting at the same time with the moveable floor, " one in the centre not reaching closely down to the revolving " table, the effect of which is to level and spread about the soft " excrement and mix it with any dry deodorizing powder" " caused to fall with it, and push it to the outside of the table, " and the other scraper at the side to catch and shovel off from " the revolving platform the dried excrement when by the revolution of the platform it comes opposite to the scraper." The movement of the door may also be used to revolve the platform, and move the second scraper. Ashes, from an ash box, may be thrown over the soil by means of a lever. The second scraper pushes the dried excrement either into a receptacle provided in the house, or through an opening in the outer wall of the house into a bin placed for its reception.

By these arrangements, a closet or commode may be placed upon any floor of a house, quite smell-tight as to the house, but communicating with the outer air. The excrement is dried by the aid of the heated air (obtained from the lamps and fires of the rooms below) admitted by a tube through the floor or wall; it is then gathered "in an inodorous state fit for agricultural and " other purposes."

[Printed, 2*s*. 8*d*. Drawings.]

A.D. 1866, November 9.—N° 2920.

WOODROFFE, Solomon William.—" Improvements in the " construction of privies, dust-holes, commodes, waterclosets, ash- " pits, and tank covers, and for other similar purposes."

This invention consists in the employment of flaps or doors, hinged to the under side of a seat flap, above which is placed another seat flap. When the upper seat flap is depressed, certain projections on its under side pass through slits or apertures in the lower seat flap, and press upon projections on the upper side of the first-mentioned flaps or doors, so that they will recede from beneath the orifice in the seat, leaving the said orifice completely open. On the seat being relieved of pressure, the said first-mentioned flaps or doors "will assume such position that " they shall form an air-tight closure, and thus prevent escape of " effluvia or noxious gas or vapour."

The drawings show these improvements applied to a privy or water closet seat. In this arrangement, the said flaps or doors are acted upon by levers that are worked by rods depending from the hinged seat. The soil falls into a tank which is supplied with disinfecting fluid at each rise of the seat. A small measuring tank may be used to determine the quantity of disinfecting fluid supplied each time. Valves in the said tanks are connected by means of wires and pulleys with one of the flap axles, so that on the depression of the seat the valve in the supply tank opens, thereby filling the measuring tank with disinfecting fluid, and on the rising of the seat, the valve in the supply tank closes, and that in the measuring tank opens, delivering its contents into the soil receptacle. "The same arrangement may be employed for " flushing the pan of a commode or other convenience."

[Printed, 10*d*. Drawing.]

A.D. 1866, November 14.—No. 2988.

MORRELL, James Conyers.—(*Provisional protection only.*)— " Improvements in the construction of dry closets, and in appa- " ratus for preparing manure."

"The seat of a closet is hinged or moveable in such manner " that on a person sitting thereon the seat will be depressed, and " by means of a connecting rod attached thereto and to one end " of a lever, motion will be communicated to such lever, and it " by its other end will by another connecting rod attached thereto " and to one end of a cranked lever give motion to a ram or " forcer within a chamber at the bottom of a hopper, and by such " means move back the ram or forcer so as to permit the chamber " or space previously occupied by the ram or forcer to become filled " with earth or other suitable dry deodorizing matter; the ram " or forcer is also acted upon by a spring or weight, by which " when the seat is again allowed to rise, the forcer or ram will be " moved quickly, and drive before it the deodorizing earth or " matters over the fresh deposit which has been received into a " suitable moveable pail or vessel below the opening in the seat." The excrement thus deodorized is next taken to a chamber suitably arranged for drying and mixing it with other matter, so as to constitute manure fitted for various purposes.

[Printed, 4*d*. No Drawings.]

A.D. 1866, December 15.—N° 3296.

HOEY, Thomas. — (*Provisional protection only.*)—" Improve- " *ments in* arrangements and apparatus for measuring and con-

" trolling the supply of water for closets and general uses, and " for the deodorisation, removal, and utilisation of excrementary " matters."

" In carrying out the invention a vessel is provided for containing in readiness and measuring the quantity of water considered " requisite for flushing and then sealing the closet basin, this " vessel being fitted as usual with a pipe leading down to the " basin and with a valve actuated by means of the ordinary " closet handle. The measuring vessel is supplied by means of " an inlet valve or tap proportioned so as when full open to " require a definite time, say about three minutes, for filling the " vessel. The inlet valve is connected to the discharge valve or " to the lever or wire actuating it so as to be closed when that " valve is opened." Separate measuring vessels may be used for flushing and for sealing; in this case the lifting of the handle discharges the flushing water, and the lowering of it that for sealing. Ratchet teeth and a spring catch oblige the handle always to be drawn up to its full height before it can be again depressed. To calculate the quantity of water used, the supply tap is connected with clockwork.

The deodorisation of "excrementary matters" is effected by " means of sulphuric acid added in small quantities to each sup- " ply of flushing water used in the closet." A small vessel like a bird cage fountain has a plunger connected to the handle in such a way as to dip into the outlet when the handle is raised. A pipe conveys the acid (or it may be sulphate of iron in solution) into the flushing pipe.

To keep the discharges from water closets from other refuse, the closet soil pipes are led to closed tanks, which may be cleared out from time to time by means of travelling tanks.

[Printed, 4*d*. No Drawings.]

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    - Lindsay, 20.
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Maidstone (*St. Paul's Literary Institute*).
Maldon, Essex (*Literary and Mechanics' Institute*).
Manchester (*Ancoats Branch Free Library*).
——— (*Athenæum*).
——— (*Campfield Free Lending Library*).
——— (*Cheetham Branch Library*).
——— (*Chorlton and Ardwick Branch Free Library*).
——— (*Hulme - Branch Free Library*).
——— (*Law Library*).
——— (*Mechanics' Institution*).
———(*Natural History Museum, Peter Street*).
——— (*Owen's College*).
——— (*Portico Library, Moseley Street*).
——— (*Rochdale Road Branch Free Library*).
——— (*Royal Exchange Library*).
Mansfield (*Co-operative Industrial Society*).
——— (*Mechanics', Artizans', and Apprentices' Library*).
——— (*Mechanics' Institute*).
Marlborough (*Reading and Mutual Improvement Society*).
Melksham (*Mutual Improvement Society*).
Melton Mowbray (*Literary Institute*).
Mere, near Bath (*Literary Association*).
Merthyr-Tydfil (*South Wales Institute of Engineers*).
Middlesborough (*Iron and Steel Institute*).
——— (*Mechanics' Institution*).
Middlewich (*Literary and Scientific Institution*).
Modbury (*Mechanics' Institution*).
Mossley (*Mechanics' Institute*).
Needham Market (*Literary Association*).
Newark (*Mechanics' Institute*).
Newbury (*Literary and Scientific Institution*).
Newcastle-upon-Tyne (*Mechanics' Institution*).
——— (*Working Men's Club*).
New Mills, near Stockport (*Mechanics' Institute*).
Newport, Isle of Wight (*Young Men's Society and Reading Room*).
Northampton (*Mechanics' Institute*).
Nottingham (*Free Library*).
——— (*Mechanics' Institution*).
——— (*Subscription Library, Bromley House*).
Odiham (*Mechanics' Institution*).
Oldham (*Analytic Literary Institution*).
——— (*Mechanics' Institution, Werneth*).
Ormskirk (*Public Library*).
Oswestry (*Institute*).
Over, Cheshire (*Working Men's Institute*).
Oxford (*North Oxford Working Men's Club*).
Patricroft (*Mechanics' Institution*).
Pembroke Dock (*Mechanics' Institute*).
Pendleton (*Mechanics' Institution*).
Penryn (*Working Men's Club and Reading Room*).
Perth (*Mechanics' Library, High Street*).
Peterborough (*Mechanics' Institution*).
Plymouth (*Working Men's Institute*).
Poole (*Literary and Scientific Institution*).
——— (*Mechanics' Institute*).
Portsea Island (*Young Men's Christian Association*).
Preston (*Institution for the Diffusion of Knowledge*).
Rawtenstall (*Mechanics' Institution*).
Reigate (*Mechanics' Institution*)
Retford (*Literary and Mutual Improvement Society*).
Richmond (*Working Men's College*).
Rotherham (*Rotherham and Masbro' Literary and Mechanics' Institute*).
Royston (*Institute*).
Ryde, Isle of Wight (*Literary and Scientific Institution*).
——— (*Philosophical and Scientific Society*).
Saffron Walden (*Literary and Scientific Institution*).
St. Just (*Institution*).
St. Leonard's (*Mechanics' Institution*).
Salford (*Working Men's Club*).

Salisbury (*Literary and Scientific Institution*).
Saltaire (*Literary Institute*).
Selby (*Mechanics' Institute*).
Sevenoaks (*Literary and Scientific Institution*).
Shaftesbury (*Literary Institution*).
Sheerness (*Literary Institute*).
Sheffield (*Branch Free Library*).
——— (*Brightside Branch Library*).
——— (*Literary and Philosophical Society, School of Arts*).
——— (*Mechanics' Institution*).
Shepton Mallet (*Reading and Mutual Improvement Society*).
Sidmouth (*Mechanics' Hall*).
Skipton, Yorkshire (*Mechanics' Institute*).
Slough (*Mechanics' Institute*).
Smethwick, Staffordshire (*Library, Reading Room, and Literary Institute*).
Southampton (*Hartley Institution*).
——— (*Polytechnic Institution*).
——— (*Workmen's Hall*).
Southport (*Athenæum*).
South Shields (*Working Men's Institute and Club*).
Southwell (*Literary Institution*).
Spalding (*Mechanics' Institute*).
——— (*Christian Young Men's Association*).
Staines (*Literary and Scientific Institution*).
——— (*Mechanics' Institute and Reading Room*).
Stalybridge, Cheshire (*Mechanics' Institution*).
Stamford (*Institution*).
Stourbridge (*Associated Institute*).
——— (*Church of England Association*).
——— (*Iron Works Reading Room and Library*).
——— (*Mechanics' Institution*).
——— (*Working Men's Institute*).
Stowmarket (*Literary Institution*).
Stratford (*Working Men's Hall*).
Sudbury, Suffolk (*Literary and Mechanics' Institute*).
Sunderland (*Working Men's Club*).
Swansea (*Royal Institution of South Wales*).
——— (*Working Man's Institute*).
Tavistock (*Mechanics' Institute*).
——— (*Public Library*).
Thornton, near Bradford (*Mechanics' Institute*).
Thornton Heath, Croydon (*Workmen's Club*).
Todmorden (*Mechanics' Institution*).
Truro (*Cornwall County Library*).
——— (*Institution*).
——— (*Royal Institution of Cornwall*).
Tunbridge (*Literary and Scientific Institute*).
——— (*Mechanics' Institute.*)
Tunbridge Wells (*Mechanics' Institution*).
——— (*Society of Literature and Science*).
Turton, near Bolton (*Chapel Town Institute*).
Tynemouth (*Free Public Library*).
Ulverston (*Temperance Hall*).
Uttoxeter (*Mechanics' Literary Institute*).
Uxbridge (*Uxbridge and Hillingdon Reading and Newsroom Institute*).
Wakefield (*Mechanics' Institute*).
Wallingford (*Free Library and Literary Institute*).
Walsall (*Free Library*).
Walsham-le-Willows, Suffolk (*Institute*).
Ware (*Institute*).
Warminster (*Athenæum*).
Watford (*Literary Institute*).
Wells, Somerset (*Mechanics' Institution, Grove Lane*).
——— (*Young Men's Society*).
Wendover (*Literary Society*).
Whaleybridge (*Mechanics' Institute*).
Whitby (*Institute*).
——— (*Museum*).
——— (*Subscription Library*).
Whitehaven (*Mechanics' Institute*).
——— (*Working Men's Reading Room*).
Whitstable (*Institute*).
Wilton (*Literary Institute*).
Winchester (*Mechanics' Institution*).
Wirksworth (*Mechanics' Institution*).
Wisbeach (*Mechanics' Institute*).
Witham (*Literary Institution*).
Witney (*Athenæum*).
Wolverhampton (*Law Library*).
——— (*Library*).
Wolverton (*Institute*).
Woodbridge (*Literary and Mechanics' Institute*).
——— (*Working Men's Hall*).
Worcester (*Railway Literary Institute*).
——— (*Workman's Hall*).
Workington (*Mechanics' Institution*).
Yarmouth, Great (*Parochial Library and Museum*).
Yeovil (*Mutual Improvement Society*).
York (*Church Institute*).
——— (*Institute of Popular Science, &c.*)
——— (*Railway Library*).

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Cardiff (*Free Library and Museum*).

Chester (*Mechanics' Institute, St. John Street*)

Coalbrookdale (*Literary and Scientific Institution*).

Coventry (*Watchmakers' Association*).

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Dublin (*Dublin Library, D'Olier Street*).

Edinburgh (*Horological Society*).

Ennis (*Public Library*).

Gloucester (*Working Men's Institute, Southgate Street*).

Ipswich (*Mechanics' Institute, Tavern Street*).

Kew (*Library of the Royal Gardens*).

Kington, Herefordshire (*Reading Institute*).

Leominster (*Literary Institute*).

London (*House of Lords*).

——— (*House of Commons*).

London (*Hon. Soc. of Gray's Inn*).

——— („ „ *Inner Temple*).

——— („ „ *Lincoln's Inn*).

——— („ „ *Middle Temple*).

——— (*Aeronautical Society*).

——— (*Athenæum Club, Pall Mall*).

——— (*British Horological Institute*).

——— (*General Post Office*).

——— (*Institution of Civil Engineers*).

——— (*Odontological Society*).

——— (*Royal Society*).

——— (*United Service Museum*).

Manchester (*Literary and Philosophical Society, George Street*).

——— (*Mechanics' Institution, David Street*).

Newcastle-upon-Tyne (*North of England Institute of Mining Engineers*).

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Tamworth (*Library and Reading Room, George Street*).

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Russia—Imperial Technological Institute, St. Petersburg.

Turkey—Literary and Scientific Institute, Smyrna.

United States—American Academy of Arts and Sciences, Boston.

——— American Institute, New York.

United States.—American Society of Civil Engineers, New York.

——— Industrial University, Champaign, Illinois.

——— Mechanics' Institute, San Francisco.

——— Mercantile Library Association, Pittsburgh, Pennsylvania.

——— Odd Fellows' Library Association, San Francisco.

——— Smithsonian Institute, Washington.

——— Wabash College, Crawfordsville, Indiana.

——— Young Men's Christian Association, Scranton, Pennsylvania.

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